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EVALUATION OF THE SOVIET TENTH FIVE-YEAR PLAN USING THE SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION

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Richard B. Foster, Director
Strategic Studies Center

A

This Technical Note is a draft final report and contains the findings relating to a specific set of research questions. Accordingly, it may be expected that the document will be revised, as appropriate, upon completion of the review process. The document does not constitute an official report of Stanford Research Institute until published in final form.

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EXECUTIVE SUMMARY

This assessment of the feasibility of the Soviet Tenth Five-Year Plan was the result of analysis employing the SRI-WEFA Econometric Model of the Soviet Union. The current version of the model, SOVMOD II, has been developed during the course of the past two years through the combined efforts of economists from Stanford Research Institute's Strategic Studies Center and the Wharton Econometric Forecasting Associates. This assessment, based on the Basic Guidelines for the Soviet economy for 1976-80 which was published in the Soviet Press following its approval at the 25th Communist Party Congress,[1] represents one of the several issues areas chosen for application of the SRI-WEFA Model, both because of its importance to U.S. policy planners, and its usefulness in illustrating the model's capabilities.

An econometric model has distinct advantages for evaluating this Soviet plan:

- Indirect, as well as direct, effects may be examined via the interdependent system of equations;
- Areas not treated extensively in the plan document may be explored; and
- Alternative projections may be constructed based on variations in Soviet policy, world economic conditions, etc.

[1] See Pravda, March 9, 1976.

On the other hand, limitations of using an econometric model in forecasting should be kept in mind:

- Interaction with the analyst is required, and thus, his skill and judgment are important;
- Projections are subject to prediction errors which increase with the length of the projection; and
- Data methodology and accuracy are crucial.

In this report, although the SRI/WEFA Model uses Western reconstructions of official Soviet data series, the model projections are adjusted upward to be comparable with official plan data.

Overview of the Tenth Five-Year Plan

A reduction of aspirations was signalled first by the Plan and State Budget for 1976, published two weeks before the initial draft of the Basic Guidelines for the Tenth Five-Year Plan in December 1976. The Ninth Five-Year Plan had been significantly underfulfilled and the growth rates foreseen for the Tenth Five-Year Plan were less ambitious and in line with actual experience under the Ninth Plan. Two bad harvests, in 1972 and 1975, were major factors in the underfulfillment, but it is clear that the gains in productivity that had been anticipated in the Ninth Plan were unrealistic. Only the target for the growth of foreign trade had been overfulfilled--linked, in part, to Soviet concern with lagging productivity.

The stress in the Tenth Five-Year Plan is on the improvement of the efficiency of production. The diminishing rate of growth of the labor supply and the diminishing effectiveness of capital investment in increasing output is implicitly recognized. No major organizational changes in the economy are anticipated by the plan, however. Fulfillment, then, may well depend on imports of machinery and equipment from the developed West.

Control Solution for the Soviet Economy, 1973-80

The term "control solution" indicates that a judgment of conditional plausibility and internal consistency has been made by the analyst. A forecast, on the other hand, discriminates among control solutions through the study of additional criteria for plausability. The projection of this control solution begins in 1973, since values for some of the variables in that year were not available. A number of assumptions concerning the values of exogenous variables were made and they are listed in the Appendix.

A comparison of the control solution with the Basic Guidelines for the Tenth Five-Year Plan indicates that aggregate output targets for industry and agriculture are feasible. The projection in the plan document for growth in real income per capita and real volume of foreign trade, however, are not borne out in the control solution. For the latter target, the control solution might have been in closer agreement with the plan if the period over which the foreign trade equations were estimated had included 1974 and 1975.

Comparison of the Tenth Five-Year Plan with the SOVMOD II Control Solution

Indicator: Five-Year Rates of Growth	Basic Guidelines Targets[1]	SOVMOD II Control[2]
GNP	--	24.9%
National Income	24.-28.%	--
Industrial Output	35.-29.%	39.4% (30.7)*
Industrial Labor Productivity	30.-34.%	33.8% (25.4)*
Industrial Employment	3.8%	4.2%
Agricultural Output (5 Year Average)	14.-17.%	14.5% (12.5)*
Real Income per capita	20.-22%	18.3%
New Capital Investment (5 Year Total)	24.-26.%	25.0%
Total Consumption	--	24.4%
Foreign Trade Turnover	30.-35.%	23.3%

* Model projections converted to Soviet GVO projections using adjustment factors computed for 1966-70. The unadjusted SOVMOD II projections are given in parentheses. The adjustment factor is a standard approximation: [1. + g (Official)]/[1. + g (Western)].

Sources: [1] Pravda, March 1976.

[2] SOVMOD II Control: 5 May 1976.

While targets for growth of industrial output at the branch level also appear, on the whole, feasible, again the control solution raises some questions. Because the allocation of capital investment among the branches of industry is not published, the model, in the control solution, allocates investment on the basis of historical patterns. A comparison of the plan and control solution projections for light industry, then, indicates that fulfillment of the plan target for that branch would require a greater allocation of capital investment to light industry than that projected by the model. On the other hand, the modest target for the petroleum industry in the plan may indicate the restriction of growth of investment from historical rates by planners or anticipation of dimishing effectiveness of capital investment.

The control solution projects that the current degree of income-expenditure imbalance will persist over the Tenth Five-Year Plan period, with a mild rate of domestic inflation. An increasing gap between administered prices and "free" farm prices is seen which may well trigger a price reform, judging from past experience. A growing deficit in the State Budget is also projected and an adjustment in expenditures or revenues will be required, the latter having been coupled with price reform in the past.

Agriculture will remain the lagging sector through the 1976-80 period. This has been recognized by the leadership as is made evident by the moderation of the growth target in the Tenth Plan. While the plan document gives little detail in the foreign trade sector, the model control solution projects a relative increase in Soviet trade with the CMEA and Developed West and relative decline in trade with the Third World. The measure of Soviet hard currency liquidity is projected to fall sharply in the control solution, and the ratio of debt less stock of hard currency to total Soviet exports to the Developed West rises substantially through 1976.

Scenario Experiments

Several alternative projections to the control solution were considered to examine the total system impact of variations in Soviet import policy, weather conditions, and the state of the world economy.

Scenario I, an alternative considering Soviet restriction of imports, was motivated by the following reasoning:

- unrestricted imports may be infeasible either because the required expansion of exports cannot be accomplished or because hard currency deficits incurred are unacceptable to the leadership, Western bankers, or both;
- after the very poor 1963 harvest, the USSR faced a similar dilemma and the scenario was based on that type of response.

Thus, in Scenario I, imports of machinery and raw materials from the CMEA and the Developed West are reduced as well as drawings on Western credits. As a result, GNP growth over 1976-80 is reduced by .5%, industrial growth by 1.0%, growth of real per capita income by .5%, and growth of total consumption by .9%.

Variations in weather conditions were examined in Scenarios II-A and II-B. In scenario II-A above normal weather conditions, the conditions of 1966-70, were imposed and for Scenario II-B, the below normal weather conditions of 1961-65 were imposed. Normal weather, as assumed in the control solution, was defined as the sample mean for the weather variables over the 1959-72 period.

Scenario II-A shows the growth of GNP to be 10.7 billion rubles greater over the five-year period due to the above normal weather. Scenario II-B, on the other hand, show GNP growth for the Tenth Five-Year Plan reduced by almost 9 billion rubles from the control solution projection. About 60% of the weather impact falls on new capital investment; the remainder on inventories and residual end-use categories, including state grain reserves. The impact on food consumption is nearly compensated by changes in the consumption of durables. Surprisingly, industrial output growth is greater than the control in both Scenario II-A and II-B. While the above normal weather impact is to be expected, the below normal weather increase in the growth of industrial output can be traced to population movement and thus an increase in the non-agricultural labor force.

Scenario III was designed to examine the impact of the Western recession on the Soviet economy. The scenario replaces the recession in world trade in 1975 by steady growth at 7% for 1975-80 and credit drawings on the West are reduced by $4 billion. In comparison with the control solution, over the Tenth Five-Year Plan, industrial production in Scenario III is 3.85 billion rubles greater and the Soviet Union's international position in 1980 is much improved with an increase of $2 billion in hard currency reserves and a lower debt ratio. Most of the impact on industrial output of increased machinery imports from the Developed West occurs after 1980 because of the lags involved in import and installation.

<u>The Input-Output Component Applied to the Tenth Five-Year Plan</u>

For the input-output component of the SRI-WEFA Model, a series of balanced input-output tables were derived from the Soviet I/O tables for 1959, 1966, and 1972 as reconstructed by Western economists. Three-factor production functions in employing labor, capital, and material inputs were then estimated with the deliveries of material inputs determined by the I/O component. The introduction of material inputs caused shifts in the output elasticities for labor and capital.

Two alternative projections were attempted for the Tenth Five-Year Plan period using the integrated I/O component. In Alternative I, the growth rates of material inputs were imposed from the control solution projections. In Alternative I, generally lower branch growth rates were projected over the Tenth Five-Year Plan due to the reduced output elasticities for capital in the three-factor production functions. This indicates the sensitivity of production function estimation for Soviet data due to variations in specification.

In Alternative II, material inputs are determined endogenously through the interaction of the I/O system and the three-factor production functions. The greatest changes from Alternative I to Alternative II occurred in industrial branches with the largest output elasticities for material inputs. Sectoral interdependencies introduced in Alternative II have a leveling effect on branch growth rates - i.e., branches that were projected to have growth rates less than the economy average grow faster under Alternative II; greater than the economy average grow slower.

Conclusions

The following conclusions may be drawn from an analysis of the Tenth Five-Year Plan using the SRI-WEFA Econometric Model:

- On the whole, the targets of the Tenth Five-Year Plan are feasible.
- In this plan, it is evident that planners have adjusted expectations to past experience.
- There will be continuing difficulties in the agricultural sector.
- There is the potential for a realignment of internal prices due to
    - divergence between administered and free prices
    - a widening deficit in the State Budget
    - the pressure of world inflation through the foreign trade sector
- Import restriction would have a negative impact on industrial output, real household income and consumption and a positive impact on the gold and reserve/import and debt/export ratios.
- Weather conditions were demonstrated as having an important impact on the whole economy over the Tenth Five-Year Plan period.
- The removal of the Western recession increased the cumulated value of Soviet industrial production by 3.85 billion rubles over the Tenth Five-Year Plan and significantly improved the international position of the USSR in 1980.

CONTENTS

Abstract

This technical note presents an overview of the Soviet Tenth Five-Year Plan based on the document approved and discussion at the Twenty Fifth Congress of the Communist Party of the Soviet Union in March, 1976. A control solution of the model, based on investment intentions and employment constraints in the plan is used to examine plan feasibility and macroeconomic consequences. Scenario experiments are described which consider the impact of import restriction policies, weather patterns and the recession in the West on the implementation of the Tenth Plan. The input-output component of the model is also described and two alternative schemes of linking the component to the macromodel for the evaluation of economic performance over the Tenth Plan period are explored.

Foreword

This technical note represents an application study of the SRI-WEFA Econometric Model of the Soviet Union, undertaken during the third phase of development work on the model funded by ARPA. The SRI-WEFA Model is a central component of the Strategic Studies Center's Soviet and Comparative Economics Program. This program is under the supervision of Dr. Herbert S. Levine, Senior Research Consultant at the SSC and Professor of Economics at the University of Pennsylvania, and M. Mark Earle, Jr., Senior Economist and Assistant Director of the SSC.

The evaluation of the Soviet Tenth Five-Year Plan was performed by the SRI-WEFA team: Dr. Donald W. Green, Research Consultant, SSC, and principal investigator of the model project, Gene D. Guill and Peter Miovic of Wharton Econometric Forecasting Associates, and Dr. Herbert S. Levine.

Richard B. Foster
Director

LIST OF TABLES

I INTRODUCTION: THE USE OF AN ECONOMETRIC MODEL IN THE EVALUATION OF SOVIET FIVE-YEAR PLANS

Evaluation of the Soviet Five-Year Plans (FYPs) has become an increasingly important task for Western economists. Given the greater availability of Soviet economic statistics and the utilization of quantitative methods, the 9th FYP was subjected to more rigorous scrutiny than were previous plans. Western skepticism regarding the feasibility of the 9th Plan was eventually confirmed by the actual performance of the economy. Presented now with the 10th FYP, we have a new analytical tool, the SRI-WEFA Econometric Model, to help in the assessment of the feasibility of a Soviet FYP and its macroeconomic consequences. SOVMOD II, the current version of the model, has been developed over the past two years by economists from Stanford Research Institute and Wharton Econometric Forecasting Associates. This medium-scale econometric model, while similar in scope and potential application to models of Western market economies, was designed to reflect Western understanding of Soviet economic institutions and bureaucratic behavior.

There are many advantages in using an econometric model for forecasting the probable development of the Soviet economy and for evaluating official Soviet Plans. First, since the model is an interdependent system of technical and behavioral relations, the analyst is able to consider indirect effects as well as direct effects, i.e., the total system impact, in quantitative terms. Second, since this macromodel is concerned with income flows and expenditures throughout the Soviet economy, one may explore the consequences of a Plan in areas not treated extensively in the published document. For example, we will consider the consequences of the Plan for household income and consumption, the State budget, controlled and market prices, the composition of foreign trade, and the Soviet balance of payments. Third, the establishment of the model with supporting software allows the analyst to construct a variety of alternative projections, encompassing total system effects, based upon variations in Soviet policy, the world economy, and the weather.

At the same time, the problems and limitations associated with the use of econometric models should be recognized and acknowledged by all model users and consumers of model analysis.

First, the model itself is only one ingredient in the forecasting process. Forecasting is an interactive process between the model and the analyst. Frequently, the skill and judgment of the analyst are the most important factors in a valid projection. The model serves as a framework for imposing regularities observed in the past upon the future and for preserving a certain degree of consistency. The analyst must judge when certain past regularities should be relaxed and where additional consistency should be imposed upon the model solution. The term "control" as defined below designates this degree of analyst participation.

Second, one should be careful not to attribute excessive precision to the quantitative results of econometric forecasts. All projections with an econometric model are subject to certain prediction errors and such errors typically increase with the length of the projection. Even where the prediction error for levels of output are one percent or less, errors in the prediction of rates of growth are naturally much larger.

Third, issues of data methodology and accuracy, which are quite important for Western economies, are crucial for the scientific analysis of the Soviet economy. Soviet and Western methods of output measurement and national income accounting differ for both practical and ideological reasons. In building the SRI-WEFA Econometric Model, the decision was made to use Western estimates of sector output and Soviet GNP. In contrast to Soviet measures of gross value of output, Western estimates of Soviet production are based upon commodity samples (measured in physical or value terms) which are aggregated using prices and value-added weights for a base year. Thus, the output measures used in our model are roughly comparable to statistics constructed for Western market economies. Without concerning ourselves here with the difficult issues of relative "bias," growth rates for the Soviet economy invariably appear lower when using Western methodology than when using Soviet methodology. For presentation purposes in this report, in order to make the projections of the model comparable with official Soviet Plan data, growth rates computed by Western measurement have been adjusted upward using adjustment factors observed in the past.[1]

In the next section, a brief overview of the 10th FYP will be presented. Then, a "control solution" developed using SOVMOD II will be introduced, along with a discussion of the assumptions underlying this projection and an evaluation of the macroeconomic consequences of the 10th FYP. In the next section, three scenarios will be presented as illustrations of the capacity of the SRI-WEFA Model to evaluate the economic impact of alternative Soviet policies, world economic conditions, and the weather. In the final section, the new input-output component introduced in the SRI-WEFA Model will be described and applied to the 10th FYP. The details of the SOVMOD II Control Solution to 1980, including assumptions and adjustments, are provided in Appendix A to this paper.

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[1] This assumes, of course, a stability in the degree of "bias." In fact, one might argue that the relative gap between Soviet and Western measures may decline slowly in the future.

II AN OVERVIEW OF THE 10TH FYP

The agricultural setback in 1975 occurred at a critical time for the Soviet Union, both economically and politically. The USSR had been enjoying its relative immunity from the inflation and recession which had beset Western capitalism in the early 1970's, and its political leaders were confident in the prospects of the Brezhnev strategy of agricultural independence and the purchase of Western technology. The 1975 grain harvest indicated once again the vulnerability of Soviet agriculture to weather disturbances. Large purchases of Western grain strained Soviet hard currency reserves, reserves which had already been depleted by declining Soviet exports to a recession-ridden West and previously ordered Soviet purchases of Western machinery and equipment.

A reduction of aspirations for the domestic economy was first signalled in the Annual Plan and Budget announced for 1976.[1] Planned rates of growth for industrial production, agricultural output and national income were scaled down from the levels of previous Plans; State financing of centralized investments, industry and construction, transport and communications, and agriculture were budgeted to grow considerably less than in recent years. The preliminary report on the 10th FYP, published two weeks later, acknowledged the underfulfillment of the 9th FYP and projected rates of growth through 1980 which were much less ambitious than those of the 9th Plan.[2] In Table I we have presented the major indicators for the 9th Plan, Official estimates of realized growth, and preliminary draft targets for the 10th Plan. The two bad harvests of 1972 and 1975

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1 Pravda, December 3, 1975, pp. 1-3.

2 Pravda, December 15, 1975, pp. 1-6. A translation of the full text has appeared in The Current Digest of the Soviet Press, 27 (January 14, 1976), pp. 1-26.

certainly were a major factor in the underfulfillment of the Plan, but it is clear that the 9th Plan was unrealistic in its anticipation of productivity gains. Official figures published recently indicate that the only area of Plan overfulfillment was in foreign trade.[1] This was related primarily to the rapid expansion of East-West trade associated with the policy of detente, an expansion in trade motivated at least in part by Soviet concern with lagging productivity.

The preliminary plan targets of the 10th FYP are significant in two respects. First, they are substantially more modest than those of the 9th Plan, an indication of an acceptance of less ambitious goals by the political leadership. Second, they are very much in line with official estimates of performance during the 9th FYP; this suggests that Soviet planners may be using recent experience more as a test of Plan reasonableness than previously.

The 10th FYP, even more than previous plans, acknowledges the severity of the constraint represented by diminishing growth in the supply of labor and a diminishing effectiveness of capital investment. The stress in the plan is on efficiency of production, improvements in quality, and the acceleration of technical progress. As is stated in the Basic Guidelines on the 10th FYP:

> It is necessary to develop on a still broader basis nationwide socialist competition for the achievement of high labor indices and the fulfillment of national-economic plans and to do everything to make the 10th Five-Year Plan a five-year plan of efficiency, a five-year plan of quality in the name of a further increase in the people's well-being.[2]

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[1] Ekonomicheskaia gazeta, May 5, 1976.

[2] Current Digest, op. cit., p. 26.

The Plan calls for labor productivity in industry to rise 30-34 percent even though capital investment is projected to rise by only 24-26 percent. Since the Plan does not appear to anticipate major gains from organizational changes, its fulfillment may well depend upon the purchase and financing of machinery imports from the Developed West.

Table 1

MAIN INDICATORS OF THE 9TH AND 10TH FYPs

Indicator: Five-Year Growth Rates	9th FYP (1971-1975) Plan Target[1]	9th FYP (1971-1975) Actual[2]	10th FYP (1976-1980) Basic Guidelines
National Income	38.6%	28.0%	24.-28.%
Real Income *per capita*	31.0%	24.0%	20.-22.%
Industrial Output	47.0%	43.0%	35.-39.%
Industrial Labor Productivity	39.0%	34.0%	30.-34.%
Industrial Employment	5.9%	6.7%	3.8%
Agricultural Output (5 Year Average)	21.7%	13.0%	14.-17.%
New Capital Investment (5 Year Total)	41.6%	41.3%	24.-26.%
Retail Trade Turnover	40.0%	36.0%	27.-29.%
Foreign Trade Turnover	33.-35.%	--	30.-35.%

Sources: [1] N. K. Baybakov (General Ed.), *Gosudarstvennyy pyatiletniy plan razvitiya narodnogo khozyaystva SSSR na 1971-1975 gody*, Moscow, 1972.

[2] *Pravda*, 7 March 1976.

III A CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

In using an econometric model for projective analysis, it is important to differentiate the factors which contribute to a projective solution and the various modes of projections. First, the major elements involved in computing a model projection are as follows:

- the <u>specification and estimation of the model</u> itself, particularly the implicit assumptions concerning future technology and behavior;
- the <u>assumptions</u> made concerning the future of exogenous variables, those not determined in the model solution; and
- the <u>intervention of the analyst</u> to compensate for deficiencies of the model and to impose additional information on model solutions.

Second, with these distinctions in mind, one may define a hierarchy of projective exercises:

- a <u>solution</u> of the model, which might not involve user intervention beyond the specification of the model and the selection of assumptions for exogenous variables;
- a <u>control solution</u> which indicates a judgment of conditional plausibility and internal consistency by the analyst; and
- a <u>forecast</u> which, in our usage, represents further discrimination among plausible control solutions, i.e., the selection of the solution which appears most likely given available information and expert opinion.

As this discussion suggests, good forecasting procedure will usually involve extensive discussion of alternative assumptions and alternative control solutions by experts both involved in and independent of the project.

The projections reported in this paper were all computed using SOVMOD II, the second-generation SRI-WEFA Soviet econometric model.[1] The version of the model used calculates total consumption as a residual category of GNP end-use, and determines Soviet grain imports and gold sales by exogenous assumption. The most important aspect of model specification is the functional form of the production functions. They are assumed to be Cobb-Douglas with all technical progress being factor-augmenting rather than disembodies, i.e., no increase in factor productivity will occur unless factors are increased. This is a particularly important assumption when one is projecting for a period when the rate of factor accumulation (labor and capital) is expected to decline.[2]

The major assumptions used in the determination of a control solution for 1973-1980 are presented in Appendix A (pp. 16-18). For the important financing variables, we have projected a moderate growth rate of 3.0 percent (slightly higher for agriculture), somewhat less than the observed growth rate for 1966-75. The projection assumes "normal" weather for the period 1976-80. For the world economy, we have projected real trade growth at 7. percent and world trade inflation at 7. percent (1976-80). Raw material prices are expected to grow at a lower rate, as are CMEA foreign trade prices. We have projected a stable exchange rate for the ruble and stable gold prices (At $120 per ounce). Variations in these assumptions for world trade variables would primarily affect the composition and level of Soviet foreign trade.

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1 This model is described and documented in Donald W. Green, Lawrence R. Klein, and Herbert S. Levine, The SRI-WEFA Soviet Econometric Model: Phase Two Documentation, Stanford Research Institute Technical Note SSC-TN-2970-4, October 1975.

2 The model has been designed, however, so that the analyst may introduce disembodied technical change into the various production functions for alternative projections.

In establishing a control solution for 1973-80, there have been several types of adjustments introduced:

- actual data available for the period 1973-75 were imposed on the model's solution path for those years;
- certain trends embedded in estimated equations of the model were modified or suppressed given additional information from the Tenth Five-Year Plan and elsewhere; and
- adjustments were made to certain other variables in response to analysis of important balances in the State budget, household accounts, and foreign trade.

Since 1973 data for some variables in the model were not available, our model projection must begin in that year. Solution values for that year, however, may be adjusted to conform to the actual data in hand. Similar adjustments were made to solution values in 1974 given new Soviet and Western data. For 1975, the most important adjustments involve the 140 M. Metric Ton grain harvest and its impact upon total agricultural output and light industry.[1]

Several trend coefficients estimated in the model over a sample period 1958-1972 were modified for use in long-term projections. The major modifications in this regard involved the equations determining the urban share of total population and the participation rate for the urban population. Our adjustments downward for these variables result, for example, in a 4.2 percent growth in industrial employment over the period 1976-1980 rather than the 12-14 percent for an initial projection.

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[1] These adjustments have been described in an earlier informal note: Donald W. Green, "The 1975 Soviet Grain Harvest, the Tenth Five-Year Plan and the U.S./USSR Grain Agreement," published in United States-Soviet Grain Agreement, S. 2492 and Other Matters, U.S. Senate Hearings, Subcommittee on International Finance of the Committee on Banking, Housing and Urban Affairs, 9-10 December 1975, U.S.G.P.O., Washington, D. C., 1976.

Besides reducing the rates of growth of employment to the neighborhood of those implied by the Basic Guidelines, the volume of investment during the 10th FYP was also restricted to the Guideline's 25 percent increase over the 9th FYP period.

The final category of user intervention in the derivation of a control solution involves the recognition of inconsistency and the imposition of plausible adjustments to lessen inconsistency in the projection. For example, the initial experiments resulted in very large Soviet trade deficits with the CMEA in the late 1970's (nearly $4 billion annually). Such deficits arose from rapid growth in Soviet imports of machinery and raw materials (15-18 percent per year). We judged that such deficits and growth rates in imports were not feasible, for both economic and political reasons, and adjusted those growth rates downward to a 12-13 percent level. A similar problem arose for Soviet hard currency trade and we chose here to adjust upward Soviet hard currency exports and increase credit drawings and gold sales in order to reduce the deficit in hard currency to manageable levels. We also adjusted certain categories of revenue in the State budget to new tax rates implied by the 1973-74 data in order to close the projected deficit in the State budget.

The main indicators of the 10th FYP are compared with those generated in the SOVMOD II control solution in Table 2 below. The aggregate output targets in the Plan for industry and agriculture appear to be feasible by the standards of the estimated macromodel. The growth in real income <u>per capita</u> projected in the Plan is not, however, attained in the model solution. Furthermore, the model projects a much lower growth in the real volume of Soviet foreign trade, approximately the growth rate projected for Soviet GNP of 23-24 percent rather than the 30-35 percent anticipated in the Plan. If the sample period used for estimating the foreign trade equations in SOVMOD II had included 1974 and 1975, the model projection for foreign trade turnover might exceed 30 percent. This would not necessarily mean that such a further expansion in Soviet foreign trade is either feasible or likely.

Table 2

COMPARISON OF THE 10TH FYP WITH THE SOVMOD II CONTROL SOLUTION

Indicator: Five-Year Rates of Growth	Basic Guidelines Targets[1]	SOVMOD II Control[2]
GNP	--	24.9%
National Income	24.-28.%	--
Industrial Output	35.-29.%	39.4% (30.7)[3]
Industrial Labor Productivity	30.-34.%	33.8% (25.4)[3]
Industrial Employment	3.8%	4.2%
Agricultural Output (5 Year Average)	14.-17.%	14.5% (12.5)
Real Income per capita	20.-22%	18.3%
New Capital Investment (5 Year Total)	24.-26.%	25.0%
Total Consumption	--	24.4%
Foreign Trade Turnover	30.-35.%	23.3%

1 Pravda, March 7, 1976.

2 SOVMOD II Control: 5 May 1976.

3 Model projections converted to Soviet GVO projections using adjustment factors computed for 1966-1970. The unadjusted SOVMOD II projections are given in parentheses. The adjustment factor is a standard approximation: [1. + g (Official)]/[1. + g (Western)].

Table 3

THE GROWTH OF INDUSTRY, 1976-1980

Industrial Category	10th FYP Percentage Growth from 1975 to 1980			SOVMOD II Control Projection Percentage Growth from 1975 to 1980		
	Output	Labor Productivity	Employment	Output [1]	Labor Productivity [1]	Employment
Total Industry	35-39	30-34	3.8	39.4	33.8	4.2
Dept. A (Producer's Goods)	38-42					
Dept. B (Consumer's Goods)	30-32					
Electroenergy	34-38	27-29	6.3	33.0	29.1	3.0
Petroleum						
Crude	26-30	28-30	-0.8			
Refined Products	25-30	39-41	-8.9	43.4	44.4	-0.7
Natural Gas	38-50	43-45	0.			
Coal	13-16	22-24	-6.9	11.9	30.4	-14.2
Ferrous Metallurgy Steel	13-21	23-25	-5.6	19.7	24.4	-3.8
Non-Ferrous Metallurgy Rare Metals	30	23-25	4.8	36.0	30.8	4.0
Chemicals & Petrochemicals	60-65	59-61	1.6	53.9	52.7	0.8
Machine-Building & Metal-Working	50-60	50	3.3	51.8	40.3	8.2
Construction Materials	30	24-26	4.0	34.9	30.6	3.3
Forest Products	22-25	25-27	-1.2	23.5	28.5	-3.9
Paper and Pulp		23-25		37.8	35.9	1.4
Light Industry	26-28	23-25	2.4	18.8	15.3	3.0
Processed Food	23-25	24-26	-0.8	23.6	25.2	-1.3

[1] Model projections are converted to Soviet GVO projections using adjustment factors computed for 1966-1970.

In Table 3, the differences between the Control Solution and the 10th FYP are indicated at the level of industrial branches. The labor allocation system in the Model has been adjusted to correspond more closely to the pattern implied in the 10th FYP, though not constrained to exact correspondence. This table may indicate certain reallocations of capital investment from the pattern projected in the Model. Since the actual planned allocation of capital investment has not been published yet, any conclusions must be tentative. However, the fulfillment of the output target for light industry (soft goods) would appear to depend upon greater capital investment than projected by the macromodel. Similarly, the modest output target for petroleum products may indicate that Soviet planners will restrict the growth of investment from historical rates or that they anticipate diminishing capital effectiveness in this branch.

A major advantage in using an econometric model to evaluate a FYP is the information generated in model solution which is generally not published in the Plan document. In the following sections, the Control Solution results will be used to indicate the macroeconomic consequences of the 10th FYP.

A. Household Income, Consumption and Retail Prices

The model projects a 24 percent rise in real household disposable income compared with a 24.4 percent rise in real consumption (private and public). Thus, the current degree of income-expenditure imbalance is expected to persist through 1980. Among categories of consumption, the most rapid growth over the period 1976-80 is projected for durables (38 percent), followed by services (27 percent), soft goods (26 percent) and food (20 percent). The model projects a very mild rate of domestic inflation with the price deflator for consumption only rising 4 percent over the five years. Virtually all of this increase derives from a projected 33 percent increase in "free market" agricultural prices (6 percent per annum). In the past, such a growing discrepancy between administered and free prices has often led the bureaucracy to institute a "price reform" to restore rough parity between the two price systems.

B. The State Budget

It is interesting to note that the USSR will face similar problems with its State Budget in the late 1970's that Western governments now face in a period of economic recession. Even with the upward adjustments in State revenues indicated by the 1973-74 budget data, SOVMOD II projects a growing deficit in the State Budget through 1980. From a surplus in 1974 of 6 B. rubles, a deficit of 2 B. rubles appears in 1976 and rises to 10 B. rubles by 1980. Expenditure growth rates will need to be adjusted downward or tax rates adjusted upward in order to restore balance in the late 1970's. Frequently such increases in tax rates have been packaged together with price reforms.

C. Agriculture

Barring some startling technological breakthrough or dramatic changes in farm organization, agriculture is expected to remain the lagging sector of the economy during the 10th FYP. This appears to have been recognized by the Party leadership itself in its moderation of the growth target for agriculture in the Plan. Whereas the agricultural sector will be producing approximately 12 percent of GNP (in established prices) during this period, it will be employing 27 percent of the total labor force and absorbing 27 percent of total capital investment. In the control solutions, it has been assumed that Soviet grain imports will continue at $1 B. per year from 1977 to 1980 under terms of the U.S.-USSR Grain Agreement and such imports will be necessary to sustain even modest growth in the livestock herd.

D. Foreign Trade and the Balance of Payments

The Basic Guidelines of the 10th FYP provide very little statistical information regarding the planned expansion of Soviet foreign trade. Fortunately, SOVMOD II provides considerably more insight into the likely evolution of that trade, providing detailed information by commodity and geographical area. Table 4 lists a variety of summary indicators for the area composition of trade and the balance of payments situation of the USSR. The model projects a relative increase in Soviet trade with developed industrial economies, both CMEA and the West, with a relative decline in trade with the Third World.

The hard currency position of the USSR has been hit hard by the necessity of grain imports and sluggish Western demand for raw materials exports. In our Control, where the model determines Soviet imports from the West without restriction, the gold-import ratio falls sharply and the debt-export ratio rises substantially through 1976.

Table 4

FOREIGN TRADE CONSEQUENCES OF THE 10TH FYP

1. Composition by Area, Imports and Exports

Area	Share of Total Imports 1970	Share of Total Imports 1980	Share of Total Exports 1970	Share of Total Exports 1980
CMEA	0.378	0.391	0.337	0.337
Other Socialist	0.068	0.042	0.110	0.077
Developed West	0.287	0.351	0.303	0.345
LDC's	0.134	0.078	0.089	0.060
Unspecified	0.113	0.138	0.161	0.181

2. Measures of Hard Currency Liquidity[1]

Gold-Import Ratio = Value of Gold Reserves at Market Price/ Total Imports from the Developed West

Debt-Export Ratio = Total Debt Less Hard Currency Stock/ Total Exports to the Developed West

Year	Gold-Import Ratio	Debt-Export Ratio
1973	1.116	0.669
1974	1.663	0.489
1975	0.778	0.896
1976	0.679	1.223
1977	0.822	1.013
1978	0.741	0.803
1979	0.667	0.612
1980	0.599	0.442

[1] The estimates of Soviet gold reserves, hard currency reserves and indebtedness used in the model were published in J. T. Farrell, "Soviet Payments Problems in Trade with the West," in Joint Economic Committee, Soviet Economic Prospects for the Seventies, Washington, 1973.

IV SOME SCENARIO EXPERIMENTS WITH SOVMOD II

In this section, several scenarios relating to the period of the 10th FYP will be discussed. These scenarios have been designed to illustrate various properties of SOVMOD II as well as to indicate plausible alternative paths for the Soviet economy to 1980.

A. Scenario I: Import Restrictions

In the derivation of the Control Solution to 1980, Soviet exports to the Developed West were determined by a model equation which responds to both Western market demand and Soviet hard currency deficits. Even so, Table 4 indicated the sharp rise in the international debt ratio for the USSR through 1976, a measure which does not return to the 1974 level until 1980. The projections for Soviet foreign trade in the Control Solution may be unreasonably large for two reasons. First, the 121 percent increase in nominal Soviet exports to the Developed West may not be feasible given Soviet supply limitations and world demand conditions. Second, the succession of Soviet hard currency deficits may be unacceptable to the Soviet leadership, western bankers, or both.

In the mid-1960's when the USSR faced a similar balance-of-payments dilemma after the 1963 harvest, its response was to reduce imports of machinery and raw materials from the Developed West. Consequently, Scenario I was based upon a restriction of Soviet imports from the West and the CMEA. Restrictions were imposed on all non-grain categories of Soviet imports from the Developed West and further restrictions were imposed upon machinery and raw material imports from the CMEA as indicated in Table 5 below. The main indicators for Scenario I are compared with the Control Solution in Table 6. Because of the reduction in machinery imports from the Developed West, the rate of growth of industrial output

Table 5

DEFINITION OF SCENARIO I: IMPORT RESTRICTION

Imports of Machinery and Equipment from CMEA	2.5 Billion Ruble reduction beyond Control distributed 1976-80 (represents approximately a 5% reduction in those flows).
Total Non-Grain Imports from the Developed West	$8 Billion reduction over 1976-80 (14% of Control total).
Imports of Machinery and Equipment from Developed West	$3.5 Billion reduction over 1976-80 (4.6% of Control total). Similar proportional reductions made for various categories of machinery imports.
Credit Drawings in Western Markets	Reduction 1977-80 of $500 Million per year from Control assumption of $1500 Million.

Table 6

SCENARIO RESULTS: MAIN INDICATORS FOR 1976-1980

Indicator: Rates of Growth	Control Solution	Scenario I: Import Restriction	Scenario IIa: 1966-70 Weather	Scenario IIb: 1961-65 Weather
GNP	23.5%[1]	23.0%[1]	24.5%[1]	23.3%[1]
Industrial Output	39.4%[2]	38.4%[2]	39.5%[2]	39.5%[2]
Agricultural Output (5 Year Average)	14.5%[2]	14.5%[2]	17.5%[2]	12.1%[2]
Real Income *per capita*	18.3%	17.8%	19.4%	17.6%
New Capital Investment (5 Year Total)	25.0%	25.0%	26.2%	23.8%
Total Consumption	24.4%	23.5%	23.9%	25.3%
Foreign Trade Turnover (Real)	23.3%	16.1%	23.5%	23.2%

1 Since GNP in 1975 is depressed because of the poor harvest, we have related a GNP five-year average (1973-77) of the Control Solution to the level of GNP in 1980.

2 Model projections were converted to Soviet GVO projections using adjustment factors computed for 1966-1970.

during the 10th FYP falls by one percentage point (from 39.4 percent to 38.4 percent). Total consumption and real household income are correspondingly reduced.

The major differences between the Control and Scenario I appear in hard currency trade and indebtedness. The gold-import ratio falls less in Scenario I because of the slower expansion in Soviet imports from the Developed West, while the debt-export ratio does not rise as high in 1976-77. However, this ratio remains above the 1974 level through the period of the 10th FYP.

B. Scenario II: Variations in Weather Conditions

In the Control Solution to 1980, weather conditions were assumed to be "normal" for each year of the 10th FYP period, normality being defined as the sample mean for the two weather variables over the period 1959-1972. To illustrate the responses to weather conditions estimated in SOVMOD II, two weather scenarios were constructed: (1) Scenario IIa with the above-normal weather conditions observed in 1966-70 imposed on the 10 FYP, and (2) Scenario IIb with the below-normal weather conditions observed in 1961-65 imposed on the 10th FYP. The main indicators for Scenarios IIa and IIb are compared with the Control Solution in Table 6, but greater detail concerning the solution paths is needed for a true comparison. This detail is provided in Table 7 below.

In the last column of Table 7 the five-year impacts of these weather patterns are indicated. Above-normal weather such as occurred in 1966-70 could add over 10 billion rubles to GNP during the 10th FYP, while below-normal weather as in 1961-65 could reduce GNP by nearly as much. SOVMOD II distributes these supply effects in a manner which may be quite surprising to Western specialists on the Soviet economy. Approximately 60 percent of the weather-induced impacts fall upon new capital investment, with most of the remaining impact falling upon inventories and the residual category of end-use (grain reserves among other items). The impact upon food consumption, which has the expected sign, is nearly compensated by variations in durables consumption. Through such compensatory movements in durables and services, total household consumption (in established prices) actually grows more rapidly in Scenario IIb than in Scenario IIa.

Another surprising result in these weather scenarios is that industrial growth exceeds the Control under both above-normal and below-normal weather conditions. Because of the impact on new capital investment, this is not surprising for Scenario IIa; in fact, one might have expected a larger effect on industrial growth. The impact in Scenario IIb is clearly unexpected. These results arise from movements in population and labor allocation. Above-normal weather raises agricultural incomes relative to industrial incomes and thereby restrains rural outmigration and the growth of industrial employment; this effect was dominated, however, by the investment effect. Below-normal weather reduces agricultural incomes relative to industrial incomes, increases rural outmigration and industrial employment, and, therefore, boosts industrial output by 1980.

C. Scenario III: The 'Burden' of the Western Recession on the Soviet Economy

As was noted earlier, part of the USSR's hard currency problems may be attributed to deficient demand for Soviet exports because of domestic recessions in the Developed West. In another scenario experiment with the macromodel, the recession which occurred in world trade in 1975 was replaced by a steady growth in real trade of 7 percent per year for 1975-1980. Soviet drawings of Western credit were also reduced by $4 billion over that period given the boost in Soviet exports to the West and Less Developed Countries. In SOVMOD II, this improvement in the USSR's debt position stimulates imports of Western machinery and equipment which in turn raise Soviet industrial production. Because of the lags involved in import response and machinery installation, the impact on industrial output is negligible until 1979-80 but continues for several years after 1980.

Table 7

SCENARIO IMPACT OF WEATHER ON SOVIET GROWTH, 1976-1980

Scenario IIa: 1966-1970 Weather Pattern

Scenario IIb: 1961-65 Weather Pattern

Variable (Units)	Scenario	Control Value 1976	Scenario Less Control Value					Sum 1976-1980
			1976	1977	1978	1979	1980	
Gross National Product	IIa	469.30	3.50	-0.82	1.52	1.10	5.42	10.72
(B. 1970 Rubles)	IIb	469.30	-0.49	0.61	-6.85	-1.52	-0.70	-8.95
New Capital Investment (Total)	IIa	114.54	0.73	0.58	0.96	1.32	2.69	6.28
(B. 1969 Rubles)	IIb	114.54	-0.12	-0.02	-1.61	-2.05	-2.34	-6.14
Food Consumption	IIa	133.24	0.52	0.10	0.26	1.00	1.64	3.52
(B. 1970 Rubles)	IIb	133.24	-0.05	0.08	-0.81	-1.24	-1.14	-3.16
Durables Consumption	IIa	21.15	-0.05	-0.27	-0.41	-0.80	-1.24	-2.77
(B. 1970 Rubles)	IIb	21.15	0.01	0.05	0.23	0.89	1.57	2.75
Agricultural Production	IIa	74.77	3.53	-0.98	1.47	1.07	5.31	10.40
(B. 1965 Rubles)	IIb	74.77	-0.50	0.64	-6.95	-1.23	-0.52	-8.56

The major contrasts between Scenario III and the Control Solution are presented in Table 8. The removal of the Western recession increases the cumulated value of Soviet industrial production by 3.85 B. 1970 rubles over the period of the 10th FYP. In addition, the international position of the USSR is improved in 1980 on the Scenario path with more than $2 Billion gained in hard currency reserves together with a much lower debt ratio.

Table 8

THE IMPACT OF THE WESTERN RECESSION
ON THE SOVIET ECONOMY, 1976-1980

Scenario III: Recession in World Trade, 1975-76, Replaced with Steady 7% Growth.

	Units	Control	Scenario III
Growth in GNP, 1975-80	%	23.5[1]	23.9[1]
Growth in Industrial Output, 1975-80	%	39.4[2]	40.3[2]
Nominal Growth of Soviet Imports of Machinery & Equipment from the Developed West, 1974-80	%	137.	143.
Nominal Growth of Soviet Exports to the Developed West, 1974-80	%	158.	170.
Hard Currency Reserves, 1980 (End Year)	M. Cur. $	-798.	1541.
Debt-Export Ratio,[3] 1980	-	0.442	0.194

[1] Five-year average (1973-77) used for 1975 level of GNP.

[2] Model projection converted to Soviet GVO basis.

[3] Debt less Hard Currency Reserves divided by Total Exports to the Developed West.

V THE APPLICATION OF THE INPUT-OUTPUT COMPONENT IN SOVMOD II TO THE 10TH FYP

One of the major objectives in developing SOVMOD II was the determination of a sequence of balanced input-output tables for the period 1959-72 and the integration of such an I-O component within the macromodel. The basis for the derivation of this sequence of tables is provided by Soviet Input-Output Tables for 1959, 1966 and 1972, reconstructed by Western economists in current producers' prices.[1] The objective was to determine a plausible movement of the material requirements matrix, the A Matrix, for unobserved years. Using the actual Tables and time-series for gross value of output and value-added by sector in current prices, intervening tables were determined by a modified RAS technique using a weighted minimization algorithm for coefficient movement.[2] The particular problem posed by the 1967 Price Reform was handled by revaluating the 1966 Table in post-reform prices. This revalued 1966 Table was then used in the interpolation between 1966 and 1972.

The integration of this sequence of balanced I-O Tables in current prices with the macromodel in constant 1970 prices posed several problems, both conceptual and computational. The principal concern in the construction of SOVMOD II was to utilize the I-O component to determine intersectoral deliveries and thereby determine a consistent vector of gross outputs by sector. From the current price series for gross value of output and value-added, we derived measures of total material inputs for each sector. These variables were introduced in the production functions for

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1 The 1972 table was a preliminary version (June 1975) provided for our research by Professor Vladimir G. Treml and analysts at the Foreign Demographic Division, U.S. Department of Commerce.

2 This methodology was developed by Gene D. Guill and Ross S. Preston and is described by Guill, "The RAS Method of Coefficient Adjustment and Soviet Input-Output Data," SRI-WEFA Working Paper #34 (revised version: September 1975).

industrial branches, expanding the specification from two factors (labor and capital) to three (labor, capital and material inputs).[1] Because of collinearity between material inputs and labor, we found it necessary to constrain the estimation of production functions for several branches of industry. The general procedure in such cases was to constrain the labor elasticity to be equal to the restricted labor share in value-added for 1970 multiplied by the ratio of value-added to gross value of output in 1970.[2] These three-factor production functions were generally acceptable in statistical terms though simulation problems arose in branches with large diagonal coefficients (large intrabranch transactions). Such problems with dynamic simulations resulted in the rejection of the three-factor equation for the branch of chemicals and petrochemicals.

A. I-O Alternative I: An Initial Experiment with the Input-Output Component

The introduction of material inputs series in the estimation of branch production functions usually changes the output elasticities for labor and capital. These shifts in factor elasticities, indicated in Table 9, would change the projections of branch output to 1980 even without any consideration of interindustry consistency. As an initial experiment, SOVMOD II was applied to the 10th FYP period under I-O Alternative I where material inputs are determined by exogenous assumption and the three-factor production functions are used. In this projection, all assumptions and adjustments made for the Control Solution were retained and material inputs were assumed to grow at the same rate as the output growth projections of the Control Solution. This Alternative I experiment thus demonstrates the

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1 Provisionally, a single deflator was adopted for all material deliveries and applied in all branches except soft goods and processed foods (major deliveries to these branches are from agriculture where prices did not rise significantly in the 1967 Reform. Eventually, improved Soviet price data will be used to derive a sector specific deflator for material inputs.

2 The restricted labor share is the sum of total wages, other money income and social security divided by total value-added, all measured in established prices provided in U.S. Government estimates of Soviet GNP in 1970.

projective impact of the shifts in factor elasticities for capital and labor. The branch series for material inputs are not consistent in any input-output sense since their growth rates are imposed from the Control projections for branch output. This experiment, therefore, assumes _ex ante_ no change in the ratio of material inputs to gross value of output; since the new growth projections for output will depart from the Control projections there will be a shift in the material intensity of branch production _ex post_.

The results of the Alternative I projection are compared with the Control Solution in Table 10. Again, these differences arise from shifts in capital and labor elasticities (and technical progress rates) between the two sets of production functions. The more significant impacts (greater than 10 percent of the Control growth rate) will be explained in reference to Table 9. The projection for coal output falls in Alternative I because of the _higher_ labor elasticity (since employment in this branch is falling over the 10th FYP). Projected growth rates for ferrous metallurgy, machine-building, forest products, and processed foods decline because of the lowered capital elasticity in the three-factor equations. The branch of non-ferrous metallurgy grows more rapidly in Alternative I because of the increase in the estimated trend coefficients from 4.5 percent to 6.1 percent (dominating the fall in labor and capital elasticities). The projected growth of paper and pulp is less in Alternative I largely because of the absence of the trend term in the three-factor equation.

Generally, the Alternative I experiment projects lower branch growth rates over the 10th FYP because of reduced output elasticities for capital. These estimated elasticities fall usually for two reasons. First, the positive elasticity for material inputs usually reduces the capital elasticity from its two-factor level. Second, imposing a labor elasticity on the estimation often results in an increase over the estimated labor elasticity for the two-factor equation (three exceptions being electroenergy, construction materials and forest products). This

Table 9

COMPARISON OF ELASTICITIES IN TWO-FACTOR AND THREE-FACTOR PRODUCTION FUNCTIONS

Branch	Two-Factor Macro Production Functions			Three-Factor Production Functions			
	Labor	Capital	Trend	Labor	Capital	Materials	Trend
Electroenergy	.4046	.6196		.080[2]	.6262	.0959	
Coal Products	.2155[1]	.3998		.385[2]	.5376	.0093	
Petroleum Products	.0657[2]	.8683[1]		.040[2]	.6408[1]	.0330	
Ferrous Metallurgy	.3682	.5337		.4482	.3929	.1142	
Non-ferrous Metallurgy	.8188	.2092	.045	.4058	--	.0741	.061
Construction Materials	1.2983	.0849	.027	.300[2]	.4126	.2624	
Chemicals and Petrochemicals	.341[2]	.7149[1]		.341[2]	.7149[1]	--	
Machine-Building and Metal-Working	.1709	.6681[1]		.252[2]	.3238[1]	.2556	
Forest Products	.648[2]	.4347		.283[2]	.1684	.3232	
Paper and Pulp	.5618	.1157	.041	.4044	.4788	.3155	
			XAT_{-1}[3]				
Soft Goods	.9222	.1983	.2706	.9896	.208[2]	.0805	
Processed Foods	.4198	.4110	.2110	.4248	.0550	.4297	

[1] In the branches where labor or capital is disaggregated further, we have reported the sum of elasticities over the disaggregation.

[2] Imposed on the estimation: Share in Value-Added for two-factor estimation; share in Value-Added times Value-Added share in Gross Output for three-factor estimation.

[3] Lagged agricultural output as a proxy for raw material inputs.

Table 10

GROWTH RATES OF INDUSTRIAL BRANCH OUTPUTS, 1975-1980[1]
COMPARISON OF CONTROL SOLUTION WITH I-O ALTERNATIVE I

Branch	g_{CON} Control Solution	g_{ALTI} Input-Output Alternative I	Percentage Change[2]
Electroenergy	24.8%	26.8%	8.1
Coal Products	7.3%	6.2%	-15.1
Petroluem Products	37.5%	37.9%	1.1
Ferrous Metallurgy	19.2%	16.0%	-16.7
Non-ferrous Metallurgy	35.6%	40.1%	12.6
Chemicals & Petrochemicals	32.6%	32.6%	0.
Machine-Building and Metal-Working	31.1%	22.8%	-26.7
Construction Materials	21.8%	21.9%	.5
Forest Products	12.8%	9.5%	-25.8
Paper and Pulp	28.6%	23.5%	-17.8
Soft Goods	15.0%	13.5%	-10.0
Processed Food	16.7%	9.2%	-44.9

[1] Growth rates presented are based upon western indexes used in SOVMOD II and not converted to Soviet GVO growth rates.

[2] Computed as follows: $(g_{ALTI} - g_{CON})/g_{CON}$.

experiment with Alternative I has served one major purpose. It clearly indicates the sensitivity of production function estimation for Soviet data to variations in specification. Econometric technique cannot alone determine the most plausible production function for projections; considerable judgment and experimentation is required. The three-factor equations for electroenergy and construction materials appear more plausible than the two-factor equations. However, in the branches of machine-building and processed foods the two-factor equations appear to generate more plausible projections. This type of experimentation is essential in the selection of production functions for the final version of the SRI-WEFA Model.

B. I-O Alternative II: An Experiment with the Endogenous Determination of Material Inputs

As a second experiment, SOVMOD II was applied to the 10th FYP period under an I-O alternative in which material inputs are determined endogenously through the interaction of the input-output system and the three-factor production functions. In this exercise, all of the assumptions and adjustments which were made for the Control Solution were again retained. Thus, I-O Alternative II differs from the Control Solution in its use of the three-factor production functions with different factor elasticities for labor and capital, and differs from I-O Alternative I in that material inputs are now determined endogenously.

This version of the I-O component introduces the material input interdependencies between sectors into the macromodel through the use of a B matrix. This matrix is formed from the 1972 input-output table by dividing each entry in the flow matrix by its row total, that is,

$$b_{ij} = \frac{x_{ij}}{X_i}$$

In the solution process this B matrix is first converted into flows by premultiplying it by the first-iteration vector of gross outputs obtained from the production functions. Material inputs delivered to each sector are next computed from this flow matrix by aggregating over each column. The vector of material inputs derived in this manner is consistent with the distributional pattern for material inputs (the B matrix) that existed in 1972 and the gross output statistics derived from the production functions. It will not necessarily be the case, however, that the vector of material inputs derived from the B matrix will be equal to the vector of material inputs used in the three-factor production functions from which the initial estimates of gross output were derived. Consequently, it is necessary to iterate between the production functions and the input-output system until a solution for sectoral gross outputs and material is obtained.[1]

I-O Alternative II results are presented and compared with I-O Alternative I in Table 11. Since the differences in these two projections arise from the endogenous determination of material inputs, attention is first directed to the percentage change in those rates of growth which is recorded in the next to last column of Table 11. The endogenous determination of material inputs in I-O Alternative II resulted in significant increases in the growth of material inputs into coal products, forest products, and paper and pulp; on the other side, the growth of material inputs decreased most significantly in electroenergy, petroleum products, machine-building and metal working, and soft goods. These changes in material inputs then affect the growth rates of branch outputs through

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[1] It should be noted that the B matrix is based upon the assumption that the inputs of a particular commodity delivered to a sector is a function only of the level of output or availability of that commodity. In this setting, the total inputs purchased by a sector are not determined by the level of output of that sector but instead by the availability of each of the products in its input listing. This relationship causes the material inputs delivered to a sector to be affected by the output levels of other sectors in the economy.

Table 11

GROWTH RATES OF INDUSTRIAL BRANCH OUTPUTS AND MATERIAL INPUTS 1975-1980[1]

Comparison of I-O Alternative I and I-O Alternative II

BRANCH	(1.) Gross Outputs Alt. I	(2.) Gross Outputs Alt. II	(3.) % Change[2]	(4.) Material Inputs Alt. I	(5.) Material Inputs Alt. II	(6.) % Change[2]	(7.) (3)/(6)
Electroenergy	26.8	26.5	-1.1	26.6	24.1	-9.4	.117
Coal Products	6.2	6.3	1.6	7.9	15.0	89.9	.018
Petroleum Products	37.9	37.8	-0.2	37.9	34.3	-9.5	.021
Ferrous Metallurgy[4]	16.0	15.8	-1.3	25.1	23.8	-5.2	.250
Non-ferrous Metallurgy[4]	40.1	40.0	-0.3				.058
Chemicals and Petrochemicals	32.6	32.6	0.0	0.0	27.8[5]		---
Machine-Building and Metal-Working	22.8	20.3	-11.0	33.1	22.9	-30.8	.357
Construction Materials	21.9	21.7	-0.9	26.4	25.7	-2.7	.333
Forest Products[4]	9.5	10.9	14.7	15.0	19.7	31.3	.470
Paper and Pulp[4]	23.5	25.1	6.8				.217
Soft Goods	13.5	13.3	-1.5	19.5	16.9	-13.3	.113
Processed Foods	9.2	9.6	4.3	19.2	20.4	6.3	.683

[1] Growth rates presented are based upon western indexes used in SOVMOD II and not converted into Soviet GVO growth rates.

[2] Defined as $(g_{ALT\ II} - g_{ALT\ I}) / g_{ALT\ I}$:

[3] Differences in the growth rates of material inputs in I-O Alternative I and the growth rates of branch outputs in the control solution arise from the difference in the period over which these statistics were calculated--the growth rates in material inputs being calculated over the period 1973-1980 while the growth rates of branch outputs were calculated over the period 1975-1980.

[4] The sectors Ferrous Metallurgy and Non-ferrous Metallurgy and Forest Products and Paper and Pulp are aggregated respectively to form the two input-output sectors Metallurgy, and Forest Products and Paper. Since material inputs are calculated as columns sums of the input-output flow matrix, the material input statistics are presented according to the input-output sectoral classification.

[5] Since the branch production functions for Chemicals and Petrochemicals does not contain material inputs as an explanatory variable, the material inputs statistic for this branch does not have any effect upon production but is determined endogenously in the solution process as the column sum of the flow matrix.

the three-factor production functions. As expected, the endogenous determination of material inputs had its most significant impacts upon those industrial branches with the largest output elasticities for material inputs.

A comparison of the ratios of the percentage change in gross output to the percentage change in material inputs (presented in the final column of Table 11) with the partial elasticities of output with respect to material inputs (shown in column 6 of Table 9) reveals a close correspondence across the industrial branches. Thus we find that the endogenous determination of material inputs in processed foods, forest products, paper and pulp, and machine-building and metal-working resulted in noticeable differences in the projected growth of output; however, the projections of the growth rates of outputs in coal products, petroleum products, and soft goods were very similar between the two I-O Alternatives.

As noted earlier, I-O Alternative II imposes an endogenous determination of material inputs under the assumption of a constant pattern of distribution of output over the forecast period. This assumption is expected to be most plausible under stable conditions and for use in short-term forecasting. For use in medium-or-long-term forecasting, such an assumption is less acceptable since material inputs change only in response to variations in the growth of delivering branches. Consequently, those sectors whose projected growth rates were less than the economy average experience greater growth rates of material inputs under I-O Alternative II; those sectors whose growth rates exceeded the economy average experience lower growth rates of material inputs. In other words, sectoral interdependencies, as recorded in the input-output table, impose a "leveling" effect on sectoral growth rates which renders an unbalanced or disproportional development path more difficult to maintain in the macro-model. Such constraints are partially valid, but our current research is directed toward the endogenization of the input-output relationships themselves. This work should provide the SRI-WEFA Model with flexibility to allow for gradual changes in the inter-sectoral relationships of the Soviet economy.

VI CONCLUSIONS

This evaluation of the Soviet 10th FYP using the SRI-WEFA Model leads to a conclusion of Plan feasibility, at least for the main indicators released in the Basic Guidelines. This conclusion, it should be noted, depended upon the Plan itself for only indications of the employment constraints and Soviet investment intentions. From there, the Model's projections rest basically on the past performance of the Soviet economy as captured in the system of estimated equations. In a sense then, Soviet planners appear to have adjusted their expectations to past experience, rather than rely on the adjustment of experience to excessive expectations.

The Model suggests certain areas of likely Plan underfulfillment as, for example, in the somewhat strained Plan targets for growth in incomes and foreign trade. There is also some divergence between the Plan and the Control Solution in the targets for individual industrial branches. It is possible, however, that these divergencies have appeared because the (unpublished) Plan allocation of investment differs from the Model's projections.

The Model also generates, in a system-wide consistent way, a wealth of detail which appears in the Control Solution (presented in the Appendix). While only reporting on a small portion of this detail, we have indicated continuing difficulties in the agricultural sector and a potential realignment of internal prices. Pressure for such a realignment stems from three sources of strain in the system: A model-predicted divergence between administered and free prices, a widening deficit in the state budget, and continued pressures of world inflation through the foreign trade sector. All three strains could be "eased" by implementing another "price reform."

Scenario analysis is a useful way of demonstrating the sensitivity of econometric forecasts to various shocks. These may be under the direct policy control of Soviet planners, as in the restriction of imports. Or, they may be outside planners' direct control as in the case of weather conditions or the business cycle of the Western industrial economies. In three scenario experiments, we obtained interesting quantitative results which illustrate the behavioral properties of the Soviet economy. Thus, in a policy-type import restriction we observed a negative impact on industrial output, real household income and consumption and a positive effect on the gold reserve-import and debt-export ratios. Dual weather-impact scenarios demonstrated the importance of the weather factor for Soviet agriculture and, consequently, for the whole economy. In a third experiment, by a counter-factual imposition of normal world trading climate for the recession years 1974-75, we examined the negative impact of the western recession on the Soviet economy.

Finally, we have reported on an important area of current and future development of the Model: The embodiment and full endogenization of input-output tables into the macromodel. As a first step, this requires the use of production functions that have material inputs as a factor of production in addition to labor and capital. Secondly, the allocation of these material inputs over time must be modeled in an internally consistent manner imposed by the input-output relationships. Our initial results in this direction are promising. They confirm our expectations in two ways. First, where partial elasticities of output with respect to material input are large, output growth rates are more seriously affected by material allocations. Second, where industrial branch growth rates diverge widely from the overall industry average, the unchanging materials input technology, imposed on the macromodel, will pull them back towards the average. In reality, the rates of growth of the different branches are bound to vary; yet, they also cannot move outside of the consistency of the input-output framework. This points toward our current research in designing a flexible input-output framework that captures the technology and scarcity-induced shifts in interbranch relations.

APPENDIX A

APPENDIX A

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	1976	1977	1978	1979	1980
				FORECAST DATA							
1	GNP,SECTOR-OF-ORIGIN,B,1970R	961	387,86	413,97	432,53	445,92	469,30	494,82	515,32	537,53	557,17
2	PERCENTAGE GROWTH IN GNP		3,20	6,73	4,48	3,10	5,24	5,44	4,14	4,31	3,65
3	GNP PER CAPITA, 1970 RR/PERSON		1560,19	1649,96	1707,70	1743,97	1818,15	1898,99	1959,03	2024,20	2078,46
4	GROWTH IN GNP PER CAPITA		2,24	5,75	3,50	2,12	4,25	4,45	3,16	3,33	2,68
5	GNP,SECTOR-OF-ORIGIN,B,1970R										
6											
7	AGRICULTURE	951	53,75	63,18	60,12	52,32	59,06	61,11	61,57	65,36	64,39
8	-GROWTH		-9,84	17,54	-4,84	-12,97	12,89	3,46	0,75	6,15	-1,48
9											
10	INDUSTRY		197,83	209,13	223,47	236,78	248,62	266,31	280,41	294,04	309,50
11	-GROWTH,TOTAL		5,66	5,72	6,85	5,96	5,00	7,12	5,29	4,86	5,26
12	-GROWTH,BY BRANCH										
13	ELECTROENERGY		7,11	3,65	4,93	6,19	7,26	3,52	3,35	3,69	4,91
14	COAL PRODUCTS		2,14	0,59	1,95	1,69	2,09	1,03	1,09	1,25	1,65
15	PETROLEUM PRODUCTS		7,26	7,36	6,99	6,58	6,92	6,57	6,67	6,47	6,26
16	FERROUS METALLURGY		3,62	2,43	4,07	3,90	3,49	3,29	3,34	3,71	4,07
17	NON-FERROUS METALLURGY		4,94	8,69	6,65	4,92	8,36	4,54	5,80	6,41	6,36
18	CONSTRUCTION MATERIALS		4,64	4,48	5,50	8,03	3,47	3,17	3,47	4,32	5,71
19	CHEMICALS & PETROCHEMICALS		6,93	1,36	8,13	8,21	7,89	4,77	5,61	6,09	4,66
20	MACH.BLDG.& METAL-WORKING		7,72	7,28	6,65	6,79	6,60	5,81	5,15	5,06	5,19
21	FOREST PRODUCTS		3,27	0,77	2,95	0,84	2,42	2,57	2,11	2,21	2,92
22	PAPER & PULP		4,50	6,36	6,94	6,56	4,56	4,37	5,21	5,69	5,99
23	SOFT GOODS		0,58	-0,04	6,72	4,53	-0,66	4,55	2,84	2,75	4,82
24	PROCESSED FOODS		3,53	1,31	6,89	2,56	0,81	4,28	3,32	3,11	4,18
25											
26	CONSTRUCTION		30,45	31,14	32,60	34,31	34,83	34,74	33,87	32,46	31,12
27	-GROWTH		6,72	2,27	4,66	5,27	1,51	-0,26	-2,50	-4,19	-4,12
28											
29	TRANSPORT/COMMUNICATION		39,01	42,34	45,32	48,37	50,50	54,03	58,05	61,49	64,99
30	-GROWTH		6,33	8,55	7,03	6,74	4,39	7,00	7,44	5,93	5,69
31											
32	DOMESTIC TRADE		19,53	19,31	20,27	21,57	22,10	22,79	23,88	24,81	25,98
33	-GROWTH		6,88	-1,08	4,96	6,41	2,47	3,08	4,78	3,93	4,72
34											
35	SERVICES/GOVERNMENT		47,31	48,86	50,76	52,56	54,19	55,84	57,55	59,38	61,19
36	-GROWTH		3,95	3,28	3,87	3,54	3,10	3,06	3,06	3,17	3,06
37											
38	NET MATERIAL PRODUCT,B,1970R		340,55	365,11	381,77	393,36	415,11	438,98	457,77	478,15	495,98
39	PERCENTAGE GROWTH IN NMP		3,10	7,21	4,56	3,04	5,53	5,75	4,28	4,45	3,73
40	GRAIN OUTPUT,M,TONS	3378	108,45	144,42	127,86	91,08	141,41	146,32	149,44	152,75	155,99
41	GROWTH IN GRAIN OUTPUT		-12,15	33,17	-11,47	-28,76	55,25	3,48	2,13	2,22	2,13
42	SHARES OF SECTORS IN GNP										
43	AGRICULTURE		0,139	0,153	0,139	0,117	0,126	0,124	0,119	0,122	0,116
44	INDUSTRY		0,510	0,505	0,517	0,531	0,530	0,538	0,544	0,547	0,555
45	CONSTRUCTION		0,079	0,075	0,075	0,077	0,074	0,070	0,066	0,060	0,056
46	TRANSPORT/COMMUNICATION		0,101	0,102	0,105	0,108	0,108	0,109	0,113	0,114	0,117
47	DOMESTIC TRADE		0,050	0,047	0,047	0,048	0,047	0,046	0,046	0,046	0,047
48	SERVICES/GOVERNMENT		0,122	0,118	0,117	0,118	0,115	0,113	0,112	0,110	0,110

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	FORECAST DATA 1975	1976	1977	1978	1979	1980
1	GNP,END-USE,B,1970R		387,86	413,97	432,57	445,92	469,29	494,86	515,32	537,52	557,22
2	GROWTH IN END-USE GNP		3,20	6,73	4,49	3,09	5,24	5,45	4,13	4,31	3,66
3	CONSUMPTION,TOTAL	134I	227,49	244,46	258,44	268,52	283,56	293,46	307,87	322,47	334,13
4											
5	FOOD	135R	108,15	116,86	123,64	126,78	133,24	138,05	142,99	148,57	152,41
6	SOFT GOODS	136R	53,22	56,80	60,39	63,56	67,37	69,83	73,84	77,44	80,35
7	DURABLE GOODS	137R	16,11	17,44	18,75	19,93	21,15	22,19	23,83	25,62	27,47
8	PERSONAL SERVICES	138R	50,01	53,35	55,66	58,25	61,80	63,40	67,21	70,87	73,92
9											
10	INVESTMENT, TOTAL		126,51	130,80	137,02	144,52	149,01	159,35	164,75	171,04	178,25
11											
12	TOTAL NEW FIXED	19I	94,26	98,32	105,12	110,51	114,54	120,08	125,61	130,53	135,37
13	AGRICULTURE	13R	18,10	19,98	21,76	23,06	23,73	24,86	25,91	27,16	28,28
14	INDUSTRY	1R	33,09	34,92	37,63	41,24	43,87	46,51	49,30	52,31	55,47
15	CONSTRUCTION	14R	3,60	3,67	3,90	3,99	3,86	3,90	3,93	3,81	3,66
16	TRANSPORT/COMMUNICATIONS	15R	9,62	10,05	10,61	11,17	11,54	12,21	12,93	13,30	13,68
17	HOUSING	16R	14,63	15,12	15,58	16,10	16,64	17,18	17,74	18,33	18,93
18	SERVICES & TRADE	17R	15,22	14,58	15,65	14,95	14,90	15,41	15,79	15,63	15,35
19	CAPITAL REPAIRS,LEVEL		19,74	21,46	22,91	24,42	25,95	27,47	29,01	30,60	32,22
20	NON-AG, INVENTORY CHANGE										
21	WHOLESALE & RETAIL TRADE	159R	1,41	2,10	1,67	1,52	2,17	2,60	1,72	2,13	2,09
22	OTHER	158R	11,10	8,92	7,31	8,07	6,34	9,19	8,41	7,78	8,58
23											
24	GOVERNMENT, TOTAL		33,04	34,31	34,46	34,89	35,30	36,23	37,27	38,38	39,50
25											
26	ADMINISTRATION		1,45	1,47	1,45	1,46	1,46	1,43	1,42	1,41	1,40
27	SOCIO-CULTURAL,EXCL.SCIENCE		6,37	6,75	6,96	7,27	7,47	7,54	7,67	7,82	7,97
28	SCIENCE		6,94	7,39	7,64	7,93	8,20	8,42	8,67	8,93	9,19
29	DEFENSE		18,28	18,69	18,41	18,23	18,18	18,83	19,51	20,21	20,94
30											
31	NET EXPORTS		-8,03	-8,84	-10,26	-14,22	-12,72	-8,61	-8,08	-7,92	-8,06
32											
33	TOTAL EXPORTS		19,08	21,43	22,15	23,61	24,95	26,91	29,09	31,42	33,86
34	TOTAL IMPORTS		27,11	30,27	32,41	37,83	37,67	35,52	37,17	39,35	41,92
35											
36	END-USE RESIDUAL*	191R	8,45	13,24	12,92	12,22	14,14	14,44	13,52	13,55	13,40
37	SHARES OF END-USE CATEGORIES IN GNP										
38	CONSUMPTION		0,59	0,59	0,60	0,60	0,60	0,59	0,60	0,60	0,60
39	INVESTMENT		0,33	0,32	0,32	0,32	0,32	0,32	0,32	0,32	0,32
40	GOVERNMENT		0,09	0,08	0,08	0,08	0,08	0,07	0,07	0,07	0,07
41	NET EXPORTS		-0,02	-0,02	-0,02	-0,03	-0,03	-0,02	-0,02	-0,01	-0,01
42	END-USE RESIDUAL		0,02	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,02

* GRAIN RESERVES, LIVESTOCK ACCUMULATION AND OTHER AGRICULTURAL INVENTORIES, STATISTICAL DISCREPANCIES

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

# DESCRIPTION	MOD, VAR,	LAGGED 1972	1973	1974	FORECAST DATA 1975	1976	1977	1978	1979	1980
1 GROWTH IN GNP, END-USE		3,20	6,73	4,49	3,09	5,24	5,45	4,13	4,31	3,66
2 PERCENT GROWTH IN END-USE CATEG'S										
3 CONSUMPTION, TOTAL		3,74	7,46	5,72	3,90	5,60	3,49	4,91	4,74	3,61
4										
5 FOOD		2,09	8,06	5,80	2,54	5,10	3,60	3,58	3,90	2,59
6 SOFT GOODS		5,47	6,73	6,31	5,25	6,00	3,64	5,75	4,86	3,76
7 DURABLE GOODS		5,90	8,29	7,49	6,28	6,13	4,93	7,40	7,50	7,21
8 PERSONAL SERVICES		4,88	6,69	4,33	4,66	6,09	2,59	6,01	5,44	4,31
9										
10 INVESTMENT, TOTAL		7,18	3,39	4,76	5,47	3,11	6,94	3,39	3,82	4,21
11										
12 TOTAL NEW FIXED		7,14	4,31	6,92	5,12	3,65	4,84	4,61	3,92	3,70
13 AGRICULTURE		9,49	10,43	8,88	5,99	2,91	4,77	4,21	4,82	4,12
14 INDUSTRY		7,14	5,51	7,77	9,58	6,37	6,02	6,00	6,11	6,05
15 CONSTRUCTION		6,29	2,06	6,24	2,14	-3,22	1,23	0,69	-3,18	-3,98
16 TRANSPORT/COMMUNICATIONS		13,46	4,50	5,52	5,36	3,28	5,80	5,90	2,83	2,67
17 HOUSING		3,82	3,29	3,06	3,33	3,36	3,27	3,27	3,27	3,27
18 SERVICES & TRADE		4,19	-4,21	7,32	-4,44	-0,32	3,38	2,50	-1,03	-1,78
19 CAPITAL REPAIRS		5,00	8,74	6,76	6,58	6,26	5,86	5,60	5,48	5,28
20 NON-AG, INVENTORY CHANGE		11,13	-11,91	-18,44	6,68	-11,15	38,51	-14,17	-2,13	7,64
21 WHOLESALE & RETAIL TRADE		-45,98	48,70	-20,20	-9,00	42,80	19,80	-34,00	24,12	-2,27
22 OTHER		28,37	-19,61	-18,03	10,27	-21,34	44,92	-8,56	-7,50	10,36
23										
24 GOVERNMENT, TOTAL		2,40	3,83	0,44	1,25	1,18	2,62	2,88	2,98	2,92
25										
26 ADMINISTRATION		-2,78	1,31	-1,30	0,32	0,06	-1,63	-0,96	-0,70	-0,93
27 SOCIO-CULTURAL, EXCL, SCIENCE		4,07	6,02	3,02	4,50	2,66	0,98	1,71	2,02	1,83
28 SCIENCE		5,79	6,59	3,33	3,87	3,39	2,68	2,94	3,03	2,92
29 DEFENSE		1,04	2,22	-1,50	-0,98	-0,27	3,60	3,61	3,61	3,61
30										
31 NET EXPORTS		70,49	10,04	16,11	38,57	-10,59	-32,30	-6,13	-1,95	1,70
32										
33 TOTAL EXPORTS		7,47	12,32	3,34	6,62	5,69	7,84	8,10	6,01	7,75
34 TOTAL IMPORTS		20,69	11,64	7,07	16,74	-0,43	-5,71	4,65	5,85	6,53
35										
36 END USE RESIDUAL		-22,89	56,65	-2,40	-5,41	15,70	2,11	-6,37	0,25	-1,15

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	1976	1977	1978	1979	1980
				FORECAST DATA							
1	GNP,INCOME SIDE,B,1970R,	96T	387,86	413,97	432,53	445,92	469,30	494,82	515,32	537,53	557,17
2	-GROWTH		3,20	6,73	4,48	3,10	5,24	5,44	4,14	4,31	3,65
3	IMPLICIT PRICE DEFLATOR										
4	(TEMPORARILY CONSUMPTION PRICE)	124T	99,85	99,87	99,98	100,19	100,03	100,53	101,27	102,31	103,67
5	-GROWTH		-0,25	0,02	0,11	0,21	-0,16	0,50	0,73	1,03	1,32
6	GNP,INCOME SIDE, CURRENT R,		387,28	413,44	432,45	446,76	469,44	497,45	521,86	549,97	577,62
7	-GROWTH		2,94	6,75	4,60	3,31	5,08	5,97	4,91	5,39	5,03
8	INCOMES,CURRENT RUBLES										
9											
10	TOTAL MONEY INCOME, HOUSEHOLD	114T	206,50	211,01	229,33	241,28	248,43	265,82	280,05	293,55	309,43
11	-GROWTH		6,12	2,18	8,68	5,21	2,96	7,00	5,36	4,82	5,41
12											
13	URBAN WORKERS GROSS EARNINGS	111B	135,94	142,41	154,24	163,06	171,31	183,14	192,99	202,11	212,36
14	-GROWTH		6,13	4,76	8,31	5,72	5,06	6,91	5,38	4,73	5,07
15	STATE & COLLECTIVE FARM WAGES	112T	27,67	24,82	28,94	27,88	25,00	27,62	28,65	29,50	31,34
16	-GROWTH		5,63	-10,29	16,60	-3,68	-10,32	10,46	3,72	2,97	6,26
17	INC, FROM SALE OF FARM PRODS,	113B	10,04	10,11	10,17	11,86	11,49	12,09	12,97	13,85	14,85
18	-GROWTH		2,14	0,72	0,52	16,67	-3,14	5,21	7,28	6,85	7,21
19	PROFITS DIST, TO CO-OP MEMBERS	180E	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
20	-GROWTH		0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
21	MILITARY PAY & ALLOWANCES	181E	3,58	3,68	3,77	3,87	3,97	4,13	4,29	4,47	4,64
22	-GROWTH		2,87	2,79	2,45	2,65	2,58	4,00	4,00	4,00	4,00
23	TRANSFER PAYMENTS	241B	27,12	29,83	32,06	34,46	36,51	38,69	41,01	43,47	46,08
24	-GROWTH		0,97	9,98	7,48	7,48	5,97	5,98	5,99	6,00	6,01
25											
26	AGRIC, INCOME IN KIND,HOUSEHOLD	115B	15,46	17,36	16,81	14,99	16,88	17,67	18,04	19,27	19,31
27	-GROWTH		-5,23	12,29	-3,16	-10,86	12,64	4,66	2,08	6,83	0,19
28											
29	SOCIAL SECTOR REVENUES*	141B	44,40	53,48	55,66	57,27	58,92	60,83	62,55	64,49	66,11
30	-GROWTH		5,97	20,44	4,08	2,90	2,87	3,26	2,82	3,11	2,51
31											
32	AMORTIZATION FUNDS	117B	35,29	38,89	42,84	47,20	51,99	57,25	63,04	69,40	76,39
33	-GROWTH		10,01	10,18	10,18	10,17	10,15	10,12	10,10	10,09	10,08
34											
35	GROSS PROFIT,NAT'L ECONOMY	118B	93,45	98,03	102,63	106,03	108,77	112,04	114,84	118,09	120,61
36	-GROWTH		3,66	4,91	4,70	3,31	2,58	3,01	2,50	2,83	2,13
37											
38	RESIDUAL**		-7,82	-5,32	-14,84	-20,01	-15,55	-16,16	-16,66	-14,83	-14,23
39	-GROWTH		-770,67	-31,87	178,62	34,86	-22,30	3,95	3,08	-10,96	-4,07
40	DISPOSABLE INCOME,HOUSEHOLDS,C,RUB,		206,88	212,29	228,60	238,01	246,52	263,32	276,88	290,65	305,41
41	-GROWTH		5,16	2,61	7,68	4,12	3,58	6,82	5,15	4,97	5,08
42											
43	TOTAL MONEY INCOME	114T	206,50	211,01	229,33	241,28	248,43	265,82	280,05	293,55	309,43
44	+ AGRICULTURAL INCOME IN KIND	115B	15,46	17,36	16,81	14,99	16,88	17,67	18,04	19,27	19,31
45	- TOTAL STATE DEDUCTIONS	144T	15,08	16,08	17,54	18,26	18,79	20,16	21,20	22,17	23,33
46											
47	CONSUMPTION PRICE	124T	99,85	99,87	99,98	100,19	100,03	100,53	101,27	102,31	103,67
48											
49	REAL DISPOSABLE INCOME	116T	207,19	212,57	228,64	237,56	246,45	261,93	273,42	284,08	294,60
50	-GROWTH		5,42	2,59	7,56	3,90	3,74	6,28	4,38	3,90	3,70

* EXCL, DEDUCTIONS FROM PROFIT OF STATE ENTRP,,TURNOVER TX & TAXES ON POPU,
**NON-ZERO ONLY IN FORECASTS WHEN GROSS PRFTS ARE NOT DETERMINED AS A RESIDUAL

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	1976	1977	1978	1979	1980
			FORECAST DATA							
BUDGET BALANCE IN CURRENT RUBLES										
REVENUES, TOTAL	1451	175,10	188,74	201,23	209,41	215,43	225,31	235,21	244,38	254,02
-GROWTH		5,48	7,79	6,62	4,06	2,88	4,59	4,39	3,90	3,95
DEDUCTIONS FROM GROSS PROFITS	1398	60,00	60,41	63,98	64,93	66,04	67,97	69,63	71,55	73,07
-GROWTH		7,91	0,69	5,90	1,49	1,71	2,92	2,45	2,76	2,11
TURNOVER TAX	1408	55,60	58,68	63,95	68,85	71,59	76,25	81,73	86,07	91,42
-GROWTH		2,02	5,53	8,98	7,66	3,97	6,52	7,18	5,31	6,22
OTHER REVENUE FROM SOCIAL SECTOR (EXCLUDING SOCIAL INSURANCE)		35,10	43,61	44,88	46,05	47,37	48,45	49,52	50,88	51,79
-GROWTH		5,97	20,44	4,08	2,90	2,87	3,26	2,82	3,11	2,51
SOCIAL INSURANCE DEDUCTION	1428	9,30	9,87	10,78	11,22	11,54	12,39	13,02	13,61	14,32
-GROWTH		5,68	6,09	9,25	4,12	2,87	7,30	5,16	4,52	5,21
TAXES ON POPULATION	1438	15,10	16,17	17,64	18,35	18,89	20,26	21,30	22,26	23,42
-GROWTH		7,86	7,11	9,07	4,04	2,91	7,25	5,15	4,52	5,21
OUTLAYS, TOTAL	1511	173,20	183,98	195,25	207,33	217,17	228,14	239,63	251,73	264,48
-GROWTH		5,48	6,23	6,12	6,19	4,75	5,05	5,04	5,05	5,06
FINANCING OF NAT'L ECONOMY	1468	84,90	90,94	97,42	104,35	109,68	115,29	121,18	127,37	133,89
-GROWTH		5,60	7,12	7,12	7,12	5,11	5,11	5,11	5,11	5,11
SOCIAL & CULTURAL MEASURES (EXCLUDING SCIENCE)		56,20	60,41	64,93	69,78	73,95	78,37	83,06	88,04	93,33
-GROWTH		7,05	7,49	7,48	7,48	5,97	5,98	5,99	6,00	6,01
SCIENCE	1488	7,30	7,67	8,05	8,45	8,87	9,32	9,78	10,27	10,79
-GROWTH		5,80	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
ADMINISTRATION	1498	1,80	1,85	1,90	1,96	2,03	2,09	[illegible]	2,23	2,30
-GROWTH		0,0	2,71	2,98	3,18	3,27	3,24	3,20	3,17	3,14
DEFENSE EXPENDITURES	152F	17,90	17,90	17,60	17,40	17,40	18,10	18,82	19,57	20,36
-GROWTH		0,0	0,0	-1,68	-1,14	0,0	4,00	4,00	4,00	4,00
EXPENDITURE RESIDUAL	150H	5,10	5,22	5,35	5,38	5,24	4,98	4,63	4,25	3,82
-GROWTH		8,51	2,26	2,51	0,62	-2,53	-5,00	-7,00	-8,36	-10,07
BUDGET SURPLUS		1,90	4,76	5,98	2,07	-1,74	-2,83	-4,42	-7,35	-10,46
-GROWTH		5,56	150,43	25,71	-65,33	-184,09	62,03	56,35	66,41	42,21

A PRODUCT OF WHARTON EFA INC., 4025 CHESTNUT ST, PHILA, PA 19104. WRITTEN PERMISSION MUST BE OBTAINED FOR SECONDARY DISTRIBUTION.

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975
1	TOTAL EXPORTS M,$US	273I	15416.	21408.	23718.	27837.
2	-GROWTH		11.66	38.87	10.79	17.37
3	TOTAL IMPORTS M,$US	290I	16105.	20841.	24064.	30901.
4	-GROWTH		29.06	29.40	15.47	28.41
5	TOTAL NET EXPORTS M,$US		-689.	567.	-346.	-3064.
6	-GROWTH		-151.92	-182.36	-161.06	784.36
7	CMEA,M,RB,*					
8	EXPORTS,TOTAL	258I	6727.	7361.	7963.	9729.
9	RAW MATERIALS	254B	3715.	3915.	4360.	5538.
10	MACHINERY	255B	1689.	1965.	2158.	2934.
11	GRAIN	256B	204.	201.	202.	0.
12	CONSUMPTION GOODS	257B	224.	238.	242.	206.
13	UNSPECIFIED	312E	895.	1042.	1000.	1050.
14						
15	IMPORTS,TOTAL	279I	7687.	7990.	8954.	10750.
16	RAW MATERIALS	275B	897.	897.	950.	1175.
17	MACHINERY	276B	3395.	3679.	4453.	5891.
18	FOOD	277B	663.	717.	783.	831.
19	CONSUMPTION GOODS	278B	1718.	1682.	1768.	1803.
20	UNSPECIFIED	311E	1014.	1015.	1000.	1050.
21						
22	NET EXPORTS	259I	-960.	-629.	-991.	-1021.
23						
24	DEVELOPED WEST					
25	EXPORTS,TOTAL	263I	2884.	5068.	6850.	7990.
26	NON-FOOD	260B	2778.	4935.	6700.	7847.
27	GRAIN	261B	2.	1.	0.	0.
28	OTHER FOOD	262B	104.	131.	150.	142.
29						
30	IMPORTS,TOTAL	285I	4097.	6131.	7199.	11651.
31	OTHER THAN GRAIN	280B	3626.	5130.	6699.	10651.
32	MACHINERY	281B	1368.	2076.	2543.	4138.
33	CONSUMER GOODS	282B	295.	[illegible]	859.	1382.
34	RAW MATERIALS	283I	1354.	1952.	2597.	4530.
35	UNSPECIFIED	313F	619.	456.	700.	600.
36	GRAIN	284E	471.	1001.	500.	1000.
37						
38	NET EXPORTS	265I	-1213.	-1063.	-349.	-3661.
39						
40	DEVELOPING COUNTRIES, M,$US					
41	EXPORTS,TOTAL	266B	1426.	1928.	2115.	2178.
42						
43	IMPORTS,TOTAL	286B	1669.	2391.	3160.	2957.
44						
45	NET EXPORTS		-243.	-463.	-1045.	-779.

#	DESCRIPTION	1976	1977	1978	1979	1980
1	TOTAL EXPORTS M,$US	30993.	35095.	39835.	45179.	51112.
2	-GROWTH	11.34	13.24	13.51	13.41	13.13
3	TOTAL IMPORTS M,$US	33820.	33802.	37497.	42071.	47506.
4	-GROWTH	9.44	-0.05	10.93	12.20	12.92
5	TOTAL NET EXPORTS M,$US	-2827.	1293.	2338.	3108.	3606.
6	-GROWTH	-7.74	-145.72	[illegible]	32.92	16.02
7	CMEA,M,RB,*					
8	EXPORTS,TOTAL	10691.	12032.	13570.	15329.	17242.
9	RAW MATERIALS	6133.	6871.	7744.	8724.	9823.
10	MACHINERY	3326.	3812.	4387.	5032.	5755.
11	GRAIN	0.	0.	0.	53.	30.
12	CONSUMPTION GOODS	132.	173.	179.	173.	191.
13	UNSPECIFIED	1100.	1177.	1259.	1349.	1442.
14						
15	IMPORTS,TOTAL	12148.	13405.	14754.	16498.	18580.
16	RAW MATERIALS	1293.	1445.	1508.	1615.	1802.
17	MACHINERY	6986.	7980.	9084.	10458.	12084.
18	FOOD	894.	951.	1007.	1067.	1117.
19	CONSUMPTION GOODS	1875.	1874.	1943.	2085.	2241.
20	UNSPECIFIED	1100.	1155.	1213.	1273.	1337.
21						
22	NET EXPORTS	-1457.	-1373.	-1185.	-1169.	-1338.
23						
24	DEVELOPED WEST					
25	EXPORTS,TOTAL	9133.	10825.	12826.	15073.	17642.
26	NON-FOOD	9017.	10681.	12672.	14913.	17464.
27	GRAIN	0.	0.	0.	0.	0.
28	OTHER FOOD	116.	143.	155.	160.	177.
29						
30	IMPORTS,TOTAL	12609.	10798.	[illegible]	14374.	16673.
31	OTHER THAN GRAIN	9609.	9798.	11437.	13374.	15673.
32	MACHINERY	3438.	3764.	4400.	5157.	6020.
33	CONSUMER GOODS	1211.	1306.	1736.	[illegible]	2654.
34	RAW MATERIALS	4460.	4212.	4769.	5503.	6437.
35	UNSPECIFIED	500.	515.	530.	546.	563.
36	GRAIN	3000.	1000.	1000.	1000.	1000.
37						
38	NET EXPORTS	-3476.	27.	389.	699.	969.
39						
40	DEVELOPING COUNTRIES, M,$US					
41	EXPORTS,TOTAL	2296.	2455.	2635.	2832.	3045.
42						
43	IMPORTS,TOTAL	2936.	3047.	3217.	3435.	3692.
44						
45	NET EXPORTS	-640.	-593.	-582.	-603.	-648.

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

# DESCRIPTION	MOD. VAR.	LAGGED 1972	FORECAST DATA 1973	1974	1975	1976	1977	1978	1979	1980
1 FOREIGN TRADE (CONTINUED)										
2 OTHER SOCIALIST COUNTRIES,M,$US										
3 EXPORTS,TOTAL		1880.	2334.	2603.	2735.	2930.	3152.	3393.	3651.	3929.
4 IMPORTS,TOTAL		1007.	1510.	1600.	1751.	1775.	1810.	1874.	1940.	2008.
5 NET EXPORTS		873.	824.	1004.	984.	1155.	1342.	1518.	1711.	1921.
6										
7 UNSPECIFIED, WORLD, M,$US										
8 EXPORTS	308E	1154.	2142.	1400.	1800.	2200.	2420.	2662.	2928.	3221.
9 IMPORTS	317E	108.	23.	18.	30.	100.	50.	50.	50.	50.
10 NET EXPORTS		1046.	2119.	1382.	1770.	2100.	2370.	2612.	2878.	3171.
11 MACHINERY IMPORTS										
12 MACH.&EQUIP.(EXCL.TRANSP.EQUIP),										
13 WEST,M.$US	211B	1276.	1805.	2133.	3945.	3383.	3068.	3635.	4381.	5146.
14 MACH.&EQUIP.,CHEMICAL,										
15 WEST,M.$US	342B	271.	389.	424.	666.	467.	630.	774.	619.	743.
16 MACHINERY, METAL WORKING,										
17 TOTAL,M.C.RUB.	343B	373.	395.	636.	864.	705.	646.	764.	928.	1076.
18 MACHINERY, MINING, MET.&PETROL.,										
19 TOTAL,M.C.RUB.	341B	212.	329.	586.	844.	775.	647.	754.	1073.	1296.
20 HARD CURRENCY BALANCES,M$US										
21 INFLOWS										
22 NET BALANCE OF TRADE	321B	-1356.	-1602.	-484.	-4496.	-4272.	-28.	411.	787.	1113.
23 NET BAL. OF SERVICES & TRNSFRS.	320E	-44.	6.	-10.	-20.	-50.	-40.	-30.	-20.	-10.
24 CREDIT DRAWINGS	330E	1030.	1690.	1700.	3000.	3500.	1500.	1500.	1500.	1500.
25 GOLD SALES	327E	300.	1000.	750.	1000.	700.	700.	700.	700.	700.
26										
27 OUTFLOWS										
28 INTEREST PAYMENTS	324B	122.	167.	217.	290.	394.	431.	405.	391.	384.
29 CREDIT REPAYMENTS	322B	451.	657.	925.	1111.	1604.	2082.	1843.	1680.	1569.
30										
31 NET INFLOWS	325I	-643.	270.	814.	-1917.	-2121.	-380.	333.	896.	1350.
32										
33 HARD CURRENCY HOLDINGS,M$US	326I	-43.	227.	1042.	-876.	-2996.	-3377.	-3044.	-2148.	-798.
34										
35 DEBT OUTSTANDING,M$US	323I	2583.	3616.	4391.	6280.	8176.	7594.	7251.	7071.	7002.
36										
37 GOLD RESERVES,TONS	328I	1950.	1896.	1999.	2010.	2078.	2154.	2236.	2326.	2424.
38 -GOLD PRODUCTION,TONS	198E	217.	223.	228.	233.	238.	245.	252.	260.	268.
39 -GOLD SALES,TONS		162.	277.	125.	222.	170.	170.	170.	170.	170.
40 -PRICE OF GOLD,M$US/TON	319F	1,85	3,61	5,99	4,51	4,12	4,12	4,12	4,12	4,12
41 -PRICE OF GOLD,$US/OZ.		57,54	112,22	186,47	140,21	128,12	128,15	128,15	128,15	128,15
42										
43 LIQUIDITY RATIO	329I	0,2501	0,5261	1,0548	0,2388	0,1000	0,1185	0,1578	0,1749	0,1791
44 -GOLD RESERVES - DEBT OUTSTANDING		1024.	3225.	7594.	2783.	385.	1279.	1962.	2514.	2987.
45										
46 GOLD RESERVES-IMPORT RATIO		0,8805	1,1159	1,6648	0,7779	0,6789	0,8218	0,7408	0,6668	0,5991
47										
48 DEBT-EXPORT RATIO		0,9105	0,6687	0,4889	0,8956	1,2232	1,0135	0,8026	0,6116	0,4421
49										
50 DEBT SERVICE RATIO		0,1987	0,1625	0,1667	0,1754	0,2188	0,2321	0,1753	0,1374	0,1137

* MULTIPLY BY 1,35 TO CONVERT TO $US

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	FORECAST DATA 1973	1974	1975	1976	1977	1978	1979	1980
1	POPULATION, TOTAL IN MILLIONS	68E	248,60	250,90	253,28	255,69	258,12	260,57	263,05	265,55	268,07
2	- GROWTH		0,93	0,93	0,95	0,95	0,95	0,95	0,95	0,95	0,95
3											
4	URBAN POPULATION	70B	146,10	149,13	152,23	155,98	158,42	161,17	164,19	166,27	168,52
5	- GROWTH		2,53	2,07	2,08	2,46	1,56	1,74	1,87	1,27	1,36
6	RURAL POPULATION	71I	102,50	101,77	101,05	99,71	99,70	99,40	98,86	99,28	99,55
7	- GROWTH		-1,25	-0,71	-0,71	-1,33	-0,00	-0,31	-0,54	0,42	0,27
8											
9	POPULATION, ABLE-BODIED (16-59/54)		136,52	139,03	141,65	144,36	146,48	148,63	150,82	153,04	155,29
10	- GROWTH		1,81	1,83	1,88	1,91	1,47	1,47	1,47	1,47	1,47
11											
12	SHARES OF POPULATION										
13											
14	URBAN		0,588	0,594	0,601	0,610	0,614	0,619	0,624	0,626	0,629
15	RURAL		0,412	0,406	0,399	0,390	0,386	0,381	0,376	0,374	0,371
16	ABLE-BODIED		0,549	0,554	0,559	0,565	0,567	0,570	0,573	0,576	0,579
17	EMPLOYMENT, TOTAL IN MILLIONS		122,44	124,38	126,90	128,69	130,00	130,58	130,36	130,46	130,24
18	- GROWTH		1,55	1,59	2,03	1,40	1,02	0,45	-0,17	0,08	-0,17
19											
20	AGRICULTURAL	67B	36,84	36,98	37,04	36,75	36,72	36,35	35,55	35,25	34,58
21	- GROWTH		-1,14	0,38	0,17	-0,80	-0,07	-1,01	-2,21	-0,84	-1,91
22	NONAGRICULTURAL		85,59	87,40	89,86	91,94	93,28	94,23	94,81	95,21	95,66
23	- GROWTH		2,76	2,11	2,81	2,31	1,46	1,02	0,61	0,43	0,47
24	PARTICIPATION RATES										
25											
26	TOTAL EMPLOYMENT/TOTAL POPULATION		0,493	0,496	0,501	0,503	0,504	0,501	0,496	0,491	0,486
27	TOTAL EMPL./ABLE-BODIED POPU.		0,897	0,895	0,896	0,891	0,887	0,879	0,864	0,853	0,839
28	AG. EMPLOYMENT/RURAL POPU.		0,359	0,363	0,367	0,369	0,368	0,366	0,360	0,355	0,347
29	NONAGR. EMPLOYMENT/URBAN POPU.		0,586	0,586	0,590	0,589	0,589	0,585	0,577	0,573	0,568

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

	DESCRIPTION	MOD. VAR.	LAGGED 1972	FORECAST DATA 1973	1974	1975	1976	1977	1978	1979	1980
1	EMPLOYMENT GROWTH, BY SECTOR										
2											
3	AGRICULTURAL										
4											
5	STATE & COLLECTIVE FARMS		-0,58	-0,09	0,11	-0,46	-1,59	-0,69	-1,97	-1,88	-1,75
6	PRIVATE		-2,43	1,49	0,30	-1,57	3,48	-1,73	-2,75	1,52	-2,26
7											
8	NONAGRICULTURAL										
9											
10	INDUSTRIAL		1,35	1,21	2,07	1,34	0,70	0,47	0,57	0,92	1,45
11	-GROWTH, BY BRANCH										
12	ELECTROENERGY		1,55	0,86	1,82	3,38	4,59	-2,66	-0,40	0,59	0,95
13	COAL PRODUCTS		-3,12	-4,59	2,97	-2,43	1,92	-7,11	-4,45	-3,18	-2,06
14	PETROLEUM PRODUCTS		0,76	4,17	3,53	0,98	-3,39	-0,79	0,66	1,19	1,76
15	FERROUS METALLURGY		0,15	0,37	1,09	0,06	-1,17	-1,07	-0,90	-0,62	-0,12
16	NONFERROUS METALLURGY		1,06	1,96	0,99	-1,10	3,35	-1,50	0,19	0,98	0,94
17	CHEMICAL & PETROCHEMICAL		1,75	2,33	3,08	3,32	-2,03	-0,39	0,78	1,11	1,38
18	MACHINE-BLDG.& METAL WORKING		2,82	2,57	3,16	1,84	0,69	1,44	1,68	1,85	2,25
19	FOREST PRODUCTS		-0,39	-1,00	0,13	-3,03	-0,67	-0,70	-1,15	-1,05	-0,40
20	PAPER & PULP		0,77	1,41	3,37	2,71	-0,70	-1,10	0,41	1,20	1,59
21	CONSTRUCTION MATERIALS		1,52	0,98	1,14	3,83	0,53	-0,05	0,18	0,80	1,81
22	SOFT GOODS		-0,04	0,13	0,98	3,97	0,66	-0,02	0,09	0,63	1,57
23	PROCESSED FOODS		0,59	0,48	2,23	1,07	0,64	-1,95	-0,71	0,08	0,62
24	RESIDUAL BRANCH		2,43	0,95	-0,65	-7,80	7,38	14,56	2,84	1,52	1,26
25											
26	CONSTRUCTION		4,58	0,88	2,49	2,50	0,15	-1,31	-3,38	-5,10	-5,30
27											
28	TRANSPORT & COMMUNICATION		2,96	2,85	2,58	2,72	1,31	-0,12	-2,10	-4,19	-5,94
29											
30	DOMESTIC TRADE		3,63	3,60	3,28	2,19	1,38	0,87	0,77	1,24	2,11
31											
32	SERVICES		3,54	3,20	3,48	3,09	2,58	2,60	2,67	2,91	2,82
33											
34	FORESTRY		-2,55	-0,60	1,12	2,37	3,31	-3,41	-7,71	-11,22	-13,78
35											
36	OTHER		3,82	7,26	5,94	4,46	13,23	11,63	15,87	15,85	13,00

SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	1976 (ASSUMPTIONS)	1977	1978	1979	1980
1	STRATEGIC POLICY VARIABLES										
2											
3	FINANCING (B CUR R)										
4											
5	INDUSTRY & CONSTRUCTION	20F	67,00	70,50	77,30	85,40	88,30	90,95	93,66	96,49	99,38
6	-GROWTH		7,72	5,22	9,65	10,48	3,40	3,00	3,00	3,00	3,00
7	TRANSPORTATION & COMMUNICATION	21E	14,50	15,80	17,60	18,80	19,60	20,19	20,79	21,42	22,06
8	-GROWTH		9,02	8,97	11,39	6,82	4,26	3,00	3,00	3,00	3,00
9	AGRICULTURE	22E	27,60	31,00	33,00	37,10	37,20	39,06	41,01	43,06	45,22
10	-GROWTH		15,48	12,32	6,45	12,42	0,27	5,00	5,00	5,00	5,00
11	DEFENSE	152F	17,90	17,90	17,60	17,40	17,40	18,10	18,82	19,57	20,36
12	-GROWTH		0,0	0,0	-1,68	-1,14	0,0	4,00	4,00	4,00	4,00
13	DEFENSE NONPERSONNEL EXP.	153E	12,20	12,20	12,50	12,80	13,10	13,62	14,17	14,74	15,33
14	-GROWTH		-3,17	0,0	2,46	2,40	2,34	4,00	4,00	4,00	4,00
15	MLTRY PAY&ALLOWNC(1973 FIG'S) BR	181E	3,58	3,68	3,77	3,87	3,97	4,13	4,29	4,47	4,64
16	-GROWTH		2,87	2,79	2,45	2,65	2,58	4,00	4,00	4,00	4,00
17	POPULATION & EDUCATION VARIABLES										
18											
19	TOTAL POPULATION (M)	68E	248,60	250,90	253,28	255,69	258,12	260,57	263,05	265,55	268,07
20	-GROWTH		0,93	0,93	0,95	0,95	0,95	0,95	0,95	0,95	0,95
21	ABLE BODIED POP. (M)		136,52	139,03	141,65	144,36	146,48	148,63	150,82	153,04	155,29
22	-GROWTH		1,81	1,83	1,88	1,91	1,47	1,47	1,47	1,47	1,47
23											
24	ENROLLMENT, HIGHER EDUCATION (000)										
25	ALL INDUSTRIAL CATEGORIES	74E	1546,40	1548,20	1555,00	1562,00	1569,00	1576,84	1584,73	1592,65	1600,61
26	-GROWTH		-0,34	0,12	0,44	0,45	0,45	0,50	0,50	0,50	0,50
27	TRANSPORT	75E	134,10	138,70	141,00	143,00	145,00	146,45	147,91	149,39	150,89
28	-GROWTH		0,75	3,43	1,66	1,42	1,40	1,00	1,00	1,00	1,00
29	MINING	333F	57,00	56,30	57,00	57,00	57,00	57,00	57,00	57,00	57,00
30	METALLURGY	334F	54,60	55,30	55,00	55,00	55,00	55,00	55,00	55,00	55,00
31	INCOME VARIABLES (B,RUB)										
32											
33	PLANND GROSS PRFT, NAT'L ECONOMY	119E	98,00	105,84	114,31	123,45	132,10	140,03	148,43	157,33	166,77
34	PRFTS DIST TO COOP MEMBRS 1973 FIG	180F	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
35	DOMESTIC PRICES										
36											
37	INDEX OF WHSL IND PRICES,										
38	HEAVY IND., 1970=100	126F	96,97	93,94	93,94	93,94	94,41	94,88	95,36	95,83	96,31
39	-GROWTH		-1,54	-3,12	0,0	0,0	0,50	0,50	0,50	0,50	0,50
40	PRICE DEFLATOR,CONSTR, 1972=100	127E	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
41	DUMMY & TREND VARIABLES										
42											
43	QTS50: TIME VAR, 1950=1,1973=24	160F	23,00	24,00	25,00	26,00	27,00	28,00	29,00	30,00	31,00
44	QLT28: LOG TIME TREND 1928=0	161E	3,81	3,83	3,85	3,87	3,89	3,91	3,93	3,95	3,97
45	QGRON: DUMMY VAR FOR 1969 ON	202F	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
46	QPLS: FIVE YEAR PLAN DUMMY (54-57,										
47	63-66, 69-71, 74-76, ETC.)	203E	0,0	0,0	1,00	1,00	1,00	0,0	0,0	1,00	1,00
48	QFYP: FIVE-YR-PLAN CYCLE (1954-57,										
49	62-64, 69-71, 76-76, ETC.)	23E	0,0	0,0	1,00	1,00	1,00	0,0	0,0	1,00	1,00
50	QS-68: SHIFT VAR FOR 1968 ON =1	222F	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

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#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	ASSUMPTIONS 1976	1977	1978	1979	1980
1	WEATHER & AGRICULTURAL VARIABLES										
2											
3	SUM OF DEV FROM MNTHLY PRECIP VAL	98E	0.094	0.715	0.614	0.0	0.0	0.0	0.0	0.0	0.0
4	WINTR TEMP INDX FOR SO. UKRAINE	99F	-0.058	0.017	0.032	0.0	0.0	0.0	0.0	0.0	0.0
5	INDX OF AG INPUTS.SOWN AREA'65=100	100E	99.00	100.00	101.00	102.00	103.00	104.00	105.00	105.00	105.00
6	VAL OF LIVESTOCK FEED(M196AR)	103E	9896.	10983.	10969.	11341.	11800.	12036.	12277.	12522.	12773.
7	-GROWTH		4.31	10.98	-0.13	3.39	4.05	2.00	2.00	2.00	2.00
8	PERCENT OF WRKG CAP IN AGR; LVSTK										
9	BEING FATTENED & YOUNG LVSTK	104F	43.70	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
10	FOREIGN TRADE										
11											
12	PRICE VARIABLES (1963=100)										
13											
14	UNIT VALUE PRICE OF EXPTS TO										
15	CMEA OF RAW MATERIALS & PRE-FABS	190F	88.23	88.87	88.90	97.50	102.50	107.62	113.01	118.66	124.59
16	-GROWTH		3.76	0.72	0.03	9.67	5.13	5.00	5.00	5.00	5.00
17	WORLD MKT P'S OF PRIMARY PRODS	193E	130.00	188.00	295.00	292.00	295.00	303.85	312.97	322.35	332.02
18	-GROWTH		13.04	44.62	56.91	-1.02	1.03	3.00	3.00	3.00	3.00
19	PRICES OF TOTAL WORLD IMPORTS	194E	128.00	154.00	216.00	231.00	248.00	265.36	283.93	303.81	325.08
20	-GROWTH		7.56	20.31	40.26	6.94	7.36	7.00	7.00	7.00	7.00
21	UNIT VALUE P'S OF SUGAR IMPORTS										
22	FROM CUBA	314F	115.33	234.31	281.00	281.00	281.00	286.62	292.35	298.20	304.16
23	-GROWTH		17.04	103.17	19.93	0.0	0.0	2.00	2.00	2.00	2.00
24	WORLD SUGAR PRICES	316F	97.00	127.00	254.00	204.00	204.00	210.12	216.42	222.92	229.60
25	-GROWTH		29.33	30.93	100.00	-19.69	0.0	3.00	3.00	3.00	3.00
26	WRLD IMPT P'S WGHD BY SOV EXPTS	296F	127.87	156.88	223.00	245.00	245.00	262.15	280.50	300.14	321.14
27	-GROWTH		2.01	22.69	42.15	9.87	0.0	7.00	7.00	7.00	7.00
28	WRLD MKT P'S OF MFD GOODS	298E	134.00	156.00	187.00	200.00	214.00	228.98	245.01	262.16	280.51
29	-GROWTH		8.06	16.42	19.87	6.95	7.00	7.00	7.00	7.00	7.00
30	INDEX OF WORLD MKT GRAIN PRICES	299E	107.00	206.00	268.00	246.00	268.00	273.36	278.83	284.40	290.09
31	-GROWTH		15.05	92.52	30.10	-8.21	8.94	2.00	2.00	2.00	2.00
32	UNIT VALUE PRICE OF IMPTS OF										
33	RAW MATERIALS FROM CMEA	310E	104.20	104.33	104.30	112.00	112.00	117.60	123.48	129.65	136.14
34	-GROWTH		-0.21	0.12	-0.03	7.38	0.0	5.00	5.00	5.00	5.00
35											
36	PRICE VARIABLES (1970=100)										
37											
38	SOV TRADE WITH WRLD, EXPTS,										
39	OFFICIAL PRICE INDEX	309E	101.00	111.00	119.00	131.00	138.00	144.90	152.14	159.75	167.74
40	-GROWTH		-3.81	9.90	7.21	10.08	5.34	5.00	5.00	5.00	5.00
41	SOV TRADE WITH WRLD, IMPTS										
42	OFFICIAL PRICE INDEX	318E	99.00	102.00	110.00	121.00	133.00	140.98	149.44	158.40	167.91
43	-GROWTH		-1.00	3.03	7.84	10.00	9.92	6.00	6.00	6.00	6.00
44	EXPT PRICE INDEX, GERMANY,										
45	SITC 7.1, NONELEC MACHINERY	344E	118.67	143.95	153.00	169.00	180.83	193.49	207.03	221.52	237.03
46	-GROWTH		5.30	21.30	6.29	10.46	7.00	7.00	7.00	7.00	7.00
47	PRICE DEFL, INTERMEDIATE MATRL &										
48	SERVICES	393E	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
49											
50	IMPTS.P DEFL,MFG GOODS(1958=100)	213E	130.30	158.00	197.00	226.00	242.00	258.94	277.07	296.46	317.21
51	-GROWTH		5.34	21.26	24.68	14.72	7.08	7.00	7.00	7.00	7.00
52	OFFICL EXC RATE OF RBL IN DOLLRS	212E	1.20	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
53	PRICE OF GOLD (MSUS/TON)	319E	1.85	3.61	5.99	4.51	4.12	4.12	4.12	4.12	4.12

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#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	ASSUMPTIONS 1976	1977	1978	1979	1980
1	FOREIGN TRADE VARIABLES (CONTINUED)										
2											
3	ACTIVITY VARIABLES										
4											
5	SUGAR PROD OF CUBA(M TONS)		4,50	6.00	6.00	6,00	6.00	6.18	6.37	6,56	6.75
6	-GROWTH		24,97	33.33	0.0	0.0	0.0	3.00	3.00	3.00	3.00
7	GRAIN PROD IN CMEA(M TONS)	293E	73,94	77.00	80.00	83.00	86.00	88,58	91.24	93.97	96.79
8	-GROWTH		8,01	4.14	3.90	3.75	3.61	3.00	3.00	3.00	3.00
9	GRAIN PROD IN W EURP(M TONS)	300E	148,32	150.00	154.00	158.00	162.00	166.86	171.87	177.02	182.33
10	-GROWTH		-0,04	1.13	2.67	2.60	2.53	3.00	3.00	3.00	3.00
11	GRAIN PROD IN LDC-S(M TONS)	303E	367,31	380.00	385.00	390.00	395.00	410.80	427.23	444.32	462.09
12	-GROWTH		-2,92	3.45	1.32	1.30	1.28	4.00	4.00	4.00	4.00
13	GOLD PRODUCTION (TONS)	198E	217,16	223.42	228.00	233.00	238.00	245.14	252.49	260.07	267.57
14	-GROWTH		31,61	2.88	2.05	2.19	2.15	3.00	3.00	3.00	3.00
15	NET MAT PROD IN CNST PIS, CMFA										
16	(1963=100)	192E	175,00	184.63	194.78	205.49	218.00	232.17	247.26	263.33	280.45
17	-GROWTH		6,71	5.50	5.50	5.50	6.09	6.50	6.50	6.50	6.50
18	GNP OF CHINA (1963=100)	306E	138,00	148.00	164.00	180.00	198.00	213.84	230.95	249.42	269.38
19	-GROWTH		7,81	7.25	10.81	9.76	10.00	8.00	8.00	8.00	8.00
20	TOTL IMPTS OF WRLD (1963=100)	305E	213,00	245.00	270.00	276.00	294.00	314.58	336.60	360.16	385.37
21	-GROWTH		9,79	15.02	10.20	2.22	6.52	7.00	7.00	7.00	7.00
22	TOTL IMPTS OF LDC-S (1963=100)	302E	5939,0	6795.0	7480.0	7480.0	7930.0	8485.1	9079.0	9714.6	10394.6
23	-GROWTH		12,27	14.41	10.08	0.0	6.02	7.00	7.00	7.00	7.00
24	TOTL IMPTS OF DW (1963=100)	297E	221,00	250.00	290.00	287.00	304.00	325.28	348.05	372.41	398.48
25	-GROWTH		9,41	13.12	16.00	-1.03	5.92	7.00	7.00	7.00	7.00
26											
27	POPULATION VARIABLES (M)										
28											
29	POP IN AFRICA,SO.AMER.,SO.ASIA	304E	1849,00	1900.00	1950.00	2000.00	2050.00	2101.25	2153.78	2207.62	2262.81
30	-GROWTH		2,67	2.76	2.63	2.56	2.50	2.50	2.50	2.50	2.50
31	POP IN EUROPEAN CMEA	294E	105,00	105.70	106.40	107.10	107.80	108.34	108.88	109.42	109.97
32	-GROWTH		0,96	0.67	0.66	0.66	0.65	0.50	0.50	0.50	0.50
33	POP IN WESTERN EUROPE	301E	365,00	368.00	371.00	374.00	377.00	379.64	382.30	384.97	387.67
34	GROWTH		0,83	0.82	0.82	0.81	0.80	0.70	0.70	0.70	0.70
35											

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#	DESCRIPTION	MOD. VAR.	LAGGED 1972	1973	1974	1975	ADJUSTMENTS 1976	1977	1978	1979	1980
1	POPULATION & EMPLOYMENT										
2											
3	POPULATION, URBAN (M)	70R	146,10	0,0	0,0	0,0	-1,00	-2,00	-3,00	-4,00	-5,00
4											
5	EMPLOYMENT, AGRICULTURAL, STATE &										
6	COLLECTIVE FARMS (M)	65R	25,85	0,0	0,0	0,0	-0,69	-0,79	-0,91	-1,05	-1,21
7											
8	EMPLOYMENT, INDUSTRIAL (000)	45R	32461,	40,	200,	50,	-100,	-250,	-400,	-550,	-600,
9											
10	EMPL., COAL PRODUCTS	47R	1056,00	0,0	0,0	0,0	66,00	72,60	79,86	87,85	96,63
11	ELECTROENERGY	46R	655,00	0,0	-10,00	0,0	33,00	36,30	39,93	43,92	48,32
12	PETROLEUM PRODUCTS	49R	1354,00	0,0	0,0	0,0	-11,00	-12,10	-13,31	-14,64	-16,11
13	FERROUS METALLURGY	48R	265,00	0,0	0,0	0,0	-11,00	-12,10	-13,31	-14,64	-16,11
14	NON-FERROUS METALLURGY	50R	760,00	0,0	10,00	0,0	33,00	36,30	39,93	43,92	48,32
15	CHEMICALS & PETROCHEMICALS	51R	1626,00	0,0	-10,00	0,0	-33,00	-36,30	-39,93	-43,92	-48,32
16	MACH-BLDG & METAL-WRKG	52R	12718,	-10,	30,	0,	-88,	-97,	-106,	-117,	-129,
17	FOREST PRODUCTS	53R	2559,00	0,0	20,00	0,0	0,0	0,0	0,0	0,0	0,0
18	CONSTRUCTION MATERIALS	54R	2070,00	-10,00	-60,00	0,0	-55,00	-60,50	-66,55	-73,20	-80,53
19	LIGHT INDUSTRY	55R	5034,00	10,00	-120,00	0,0	0,0	0,0	0,0	0,0	0,0
20	PROCESSED FOOD	56R	2920,00	20,00	10,00	0,0	44,00	48,40	53,24	58,56	64,42
21	RESIDUAL	57R	1182,00	-10,00	130,00	0,0	22,00	24,20	26,62	29,28	32,21
22											
23	EMPLOYMENT, FORESTRY (000)	58R	443,00	20,00	-10,00	0,0	30,00	30,00	30,00	30,00	30,00
24											
25	EMPLOYMENT, CONSTRUCTION (000)	60R	9986,00	-30,00	-120,00	0,0	30,00	30,00	30,00	30,00	30,00
26											
27	EMPL., TRANS. & COMMUNIC. (000)	61R	9881,00	60,00	-100,00	0,0	40,00	40,00	40,00	40,00	40,00
28											
29	EMPL., TRADE, ETC. (000)	62R	8100,00	50,00	50,00	0,0	0,0	0,0	0,0	0,0	0,0
30											
31	EMPL., GOV'T & SERVICES (000)	63R	23663,	-40,	-50,	-50,	0,	150,	300,	450,	500,
32											
33	EMPLOYMENT, OTHER (000)	59R	1061,00	-100,00	30,00	0,0	0,0	0,0	0,0	0,0	0,0
34											
35	EMPL., ALL NON-AG. SECTORS (000)	64R	85595,0	0,0	-80,0	0,0	-800,0	-2000,0	-3200,0	-4400,0	-5600,0
36	WAGE & INCOME VARIABLES										
37	WAGES, INDUSTRY,C,RR,	105R	1705,20	0,0	30,00	0,0	0,0	0,0	0,0	0,0	0,0
38	WAGES, CONSTRUCTION,C,RR,	107R	1912,80	-30,00	-30,00	-30,00	-30,00	-30,00	-30,00	-30,00	-30,00
39	ACTUAL GROSS PROFITS, NAT'L ECON,										
40	B,CURR,RUB,	118R	93,45	-4,00	-3,50	0,0	-3,18	-3,37	-3,57	-3,79	-4,01
41	REVENUE VARIABLES (B,RUB)										
42	POPU (INCOME TX, STATE BONDS, ETC)	143R	15,10	0,80	0,80	0,80	0,84	0,88	0,93	0,97	1,02
43	SOCIAL INSURANCE DEDUCTIONS	142R	9,30	0,30	0,30	0,30	0,31	0,33	0,35	0,36	0,38
44	OTHER SOCIAL SECTORS	141R	44,40	7,30	7,00	7,00	7,35	7,72	8,10	8,51	8,93
45	DEDUCTIONS FROM PROFIT, ST ENTRP,	139R	60,00	2,00	4,00	4,00	4,20	4,41	4,63	4,86	5,11
46	TURNOVER TAX	140R	55,60	0,80	-1,00	0,0	0,0	0,0	0,0	0,0	0,0
47	EXPENDITURE VARIABLES (B,CURR,R)										
48	FINANCING THE NAT'L ECONOMY, TOTAL	146R	84,90	0,0	0,0	0,0	-2,10	-2,20	-2,32	-2,43	-2,55
49	SOCIAL & CULTURAL MEASURES										
50	(INCLUDING SCIENCE)	147R	63,50	0,0	0,0	0,0	-1,05	-1,10	-1,16	-1,22	-1,28

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#	DESCRIPTION	MOD. VAR.	LAGGED 1972	ADJUSTMENTS 1973	1974	1975	1976	1977	1978	1979	1980
1	CAPITAL INVESTMENT VARIABLES										
2											
3	INDUSTRY (B72R)	1B	33,09	-0,90	-0,50	0,0	-0,50	-0,50	-0,50	-0,50	-0,50
4											
5	ELECTROENERGY (B70R)	2B	3,42	0,0	-0,30	0,0	0,0	0,0	0,0	0,0	0,0
6	COAL PRODUCTS (B70R)	3B	1,71	-0,02	-0,10	0,0	0,0	0,0	0,0	0,0	0,0
7	PETROLEUM PRODUCTS (B70R)	4B	4,23	0,0	-0,24	0,0	0,0	0,0	0,0	0,0	0,0
8	FERROUS METALS (B70R)	5B	2,37	0,09	0,10	0,0	0,0	0,0	0,0	0,0	0,0
9	CHEMICALS & PETROCHEMICALS(B70R)	6B	2,76	0,13	0,0	0,0	0,0	0,0	0,0	0,0	0,0
10	MACH-BLDG & METAL-WRKG (B70R)	7B	6,98	-0,14	0,30	0,0	0,0	0,0	0,0	0,0	0,0
11	FOREST PRODUCTS (B70R)	8B	1,64	-0,08	-0,20	0,0	0,0	0,0	0,0	0,0	0,0
12	CONSTRUCTION MATERIALS (B70R)	9B	1,98	-0,10	0,0	0,0	0,0	0,0	0,0	0,0	0,0
13	LIGHT INDUSTRY (B70R)	10B	1,48	-0,11	-0,14	0,0	0,0	0,0	0,0	0,0	0,0
14	PROCESSED FOOD (B70R)	11B	2,50	0,02	0,09	0,0	0,0	0,0	0,0	0,0	0,0
15											
16	AGRICULTURE (B72R)	13B	18,10	-0,28	0,20	0,0	-0,20	-0,20	-0,20	-0,20	-0,20
17											
18	CONSTRUCTION (B.RUB)	14B	3,60	-0,10	-0,10	0,0	-0,20	-0,20	-0,20	-0,20	-0,20
19											
20	TRANSPT & COMMUNICATIONS (B.RUB)	15B	9,62	-0,40	-0,10	0,0	-0,20	-0,20	-0,20	-0,20	-0,20
21											
22	HOUSING,ADJ TO 1970 PRICES (B.RUB)	16B	14,63	0,0	-0,04	0,0	0,0	0,0	0,0	0,0	0,0
23											
24	SERVICES (B.72R)	17B	15,22	-0,90	1,00	0,0	1,00	1,00	1,00	1,00	1,00
25											
26	CHANGE IN INV STOCK,END YR (B70R)	58B	443,00	20,00	-10,00	0,0	30,00	30,00	30,00	30,00	30,00
27	PRODUCTION VARIABLES										
28											
29	INDUSTR. OUTPUT INDX,TOTL 1970=100	76B	112,00	0,0	0,0	-0,30	-2,00	-0,50	0,0	0,0	0,0
30	CONSTRUCTION MATERIALS, 1970=100	85B	110,65	-4,40	-4,00	-5,00	-6,00	-6,30	-6,61	-6,95	-7,29
31	TRANS-COMM INDEX, 1970=100	91B	113,43	0,0	0,0	0,0	-3,00	-2,00	0,0	0,0	0,0
32	AGRICULTURAL PROD, TOTAL (B.RUB)	88B	66,40	0,0	-1,30	-5,00	0,0	2,00	2,50	4,00	3,50
33	POTENTIAL AG. OUTPUT (B.RUB)	89B	74,00	0,0	-3,50	-3,50	-3,00	-3,00	-2,00	0,0	0,0
34	GRAIN (M TONS)	337B	108,45	3,30	-17,30	-44,00	0,0	0,0	0,0	0,0	0,0
35	SECOND PEAK GRAIN OUTPUT (MTONS)	295B	131,50	0,0	-5,00	-5,00	-3,24	-3,50	-3,78	-4,05	-4,41
36	DOMESTIC PRICE VARIABLES (1970=100)										
37											
38	INDX OF ST RETAIL P'S FOR FOOD	121B	100,66	0,0	0,40	0,0	0,0	0,0	0,0	0,0	0,0
39	PRICE OF FOOD SOLD TO CONSUMER										
40	COOPS AT NEGOTIATED P'S	122B	102,00	-1,80	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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SRI-WEFA ECONOMETRIC MODEL OF THE USSR
CONTROL SOLUTION FOR THE SOVIET ECONOMY, 1973-1980

* D E S C R I P T I O N	MOD. VAR.	LAGGED 1972	1973	1974	1975	1976 (ADJUSTMENTS)	1977	1978	1979	1980
FOREIGN TRADE VARIABLES										
IMPORTS										
DA, MACH, REC IP(LESS TRANS EQUIP)	2118	1276.	300.	0.	800.	400.	0.	0.	0.	0.
FROM DA, OTHER THAN GRAIN	2208	3626.	350.	0.	2000.	1000.	0.	0.	0.	[illegible]
FROM DA, MACHINERY	2218	1368.	-400.	0.	1000.	500.	0.	0.	0.	[illegible]
FROM WEST, CHEMICAL EQUIP.	3428	271.	15.	0.	0.	0.	0.	0.	0.	[illegible]
FROM CMEA, RAW MATERIALS	2758	337.	0.	0.	0.	-100.	-200.	-400.	-600.	[illegible]
FROM CMEA, MACHINERY	2768	3395.	0.	0.	0.	-700.	-1000.	-1500.	-2000.	[illegible]
TOTAL FROM LDC	2568	1662.	25.	0.	0.	0.	0.	0.	0.	[illegible]
FROM YUGOSL & FAR EASTERN SOCIALIST COUNTRIES	2578	621.	100.	0.	0.	0.	0.	0.	0.	[illegible]
FROM CUBA	2598	252.	-24.	0.	0.	0.	0.	0.	0.	[illegible]
EXPORTS										
TO CMEA, RAW MATERIALS	2548	3715.	-100.	0.	0.	0.	0.	0.	0.	[illegible]
TO CMEA, MACHINERY	2558	1689.	100.	0.	0.	0.	0.	0.	0.	[illegible]
TO CMEA, GRAIN	2568	204.	47.	0.	0.	0.	0.	0.	0.	[illegible]
TO CMEA, FOOD & CONSUM GOODS	2578	224.	54.	0.	0.	0.	0.	0.	0.	[illegible]
TO DA, FOOD	2628	104.	18.	0.	0.	0.	0.	0.	0.	[illegible]
TO DA, OTHER THAN FOOD	2608	2776.	[illegible]	-2400.	-300.	330.	363.	399.	439.	483.
TO DA, GRAIN	2618	2.	9.	0.	0.	0.	0.	0.	0.	[illegible]
TO LDC, GRAIN	2678	62.	78.	0.	0.	0.	0.	0.	0.	[illegible]
TO YUGOSL & FAR EASTERN SOCLST COUNTRIES	2688	1020.	27.	0.	0.	0.	0.	0.	0.	[illegible]
TO CUBA	2723	739.	19.	0.	0.	0.	0.	0.	0.	[illegible]
HARD CURRENCY, MSUS										
BALANCE OF PAYMENTS, HARD CURR.	3218	-1356.	-253.	0.	0.	0.	0.	0.	0.	[illegible]
CREDIT REPAYMNTS IN HARD CURR.	3228	451.	56.	0.	0.	0.	0.	0.	0.	[illegible]
GNP END-USE RESIDUAL (R1972R)	1918	6.25	0.0	0.0	4.00	3.00	2.00	1.00	0.0	0.0
NET CHANGE IN BASIC INDUST CHEMICALS AND PETROCHEMICALS (R1555R)	1728	1.70	-0.70	0.30	0.40	0.0	0.0	0.0	0.0	0.0

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